THE RELATIONSHIP BETWEEN SELECTED SOCIOECONOMIC VARIABLES AND STATE EFFORT TO SUPPORT PUBLIC SCHOOLS

By

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Abstract of Dissertation Presented to the Graduate Council
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One of the goals of school finance research is to explain fiscal theory and economic behavior as they relate to the financial support of public education. The concept of state and local effort has long been a part of the literature and research in school finance. It is no longer enough simply to show that variations exist among states in their relative efforts for education.

The problem in this study was to determine the relationship between selected socioeconomic variables and state effort in the support of public schools in the fifty states of the United States. The specific aspects of the problem were as follows:

1. To develop two measures of state effort to support education: one, an income-based measure, State Effort Index 1; and the other, a tax-based measure, State Effort Index 2.
2. Using the two effort indices, to determine which variable or variables accounted for the variance in effort among all the states combined, among the states grouped according to above or below average effort, and among the states grouped according to above or below average fiscal capacity.

3. To examine the findings of sub-problems one and two and to compare the results of the two effort indices in terms of the findings and the variables associated with each.

The socioeconomic variables were derived from the literature and research and included variables related to income, public education, demographic characteristics, and other governmental functions.

The research for this study was conducted in five phases. Phase I involved the collection of data and the calculation of the two effort indices. The collection of socioeconomic data comprised Phase II. Phase III consisted of a series of stepwise regression equations having state effort for education as the dependent variables. Regression equations were calculated for five categories of states based on effort and fiscal capacity. For each category of states, the regression equations were calculated for the two effort indices. In Phase IV a principal component analysis was used to reduce the socioeconomic variables to a smaller set of uncorrelated factors that reflected the independent dimensions of the original data and factor scores were calculated. In Phase V, the factor scores were used in stepwise regression equations having State Effort Index 1 and State Effort Index 2 as the dependent variables.

Seven of the variables or factors were positively related to state effort in at least five regression equations. They were per capita expenditures for other governmental functions; school age population (ages 5-17) as a percent of total population; percent change in public school enrollment, 1962-72; Income/Education; Government; Young/Growth; and Unemployment/Consolidation. Per capita expenditures for other governmental functions and the factor Government were both positively related to state effort for education each time they entered the equation.

Only one variable and one factor entered in a negative direction in at least five of the regressions. They were local basic administrative units per 10,000 pupils and High state support/Low education. Seven variables were negatively related to state effort in all the regressions they entered. These were percent school revenue from local government; population per square mile; enrollment in grades 9-12 as a percent of total public school enrollment; per capita expenditures for higher education; percent population age 25 and older with four or more years of high school; percent population in SMSA; and percent population age 65 and older.

State effort for education and per capita expenditures for other governmental functions were positively associated. In other words, those states that spent proportionately more per capita for other governmental functions made a higher effort for public education. Both variables could be explained by the people's expectations of government for a variety of public services.

Levels of state effort for education are determined by the degree to which states can control or not control certain socioeconomic variables. However, certain variables may, in fact, be proxies for a broader class of idiosyncratic variables reflecting the people's beliefs, values, and attitudes.

CHAPTER I

INTRODUCTION

Numerous studies in the past forty years have demonstrated the existence of wide variations in the fiscal capacity and tax effort for the support of public education among and within the various states.[1] Such studies have shown that tax burdens for education are not being shared equitably; i.e., those states and local school districts with greater fiscal capacity often tend to exert a lesser tax effort to support their schools than do the poorer areas. However, some relatively poor jurisdictions may put forth little tax effort because an increased tax burden may yield only marginal returns in terms of the availability of increased educational revenues.

Such variations in fiscal capacity and tax effort have been an impediment to the achievement of an equitable state school finance program. The degree to which these variations are allowed to influence the provision of public education is one of the major problems facing policymakers today. If the American public is to be committed to the realization of the goals of equality of educational opportunity and tax equity, the barriers created by such variations in fiscal capacity and tax effort must be overcome.

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[1] See for example, Measuring the Fiscal Capacity and Effort of States and Local Areas (Washington, D.C.: Advisory Commission on Intergovernmental Relations, 1971); Lyle W. Ashby, "The Effort of the States to Support Education as Related to Adequacy and Ability," vol. 14, Research Bulletin (Washington, D.C.: National Education Association, 1936); and Richard A. Rossmiller, James A. Hale, and Lloyd E. Frohreich, Fiscal Capacity and Education Finance: Variations Among States, School Districts and Municipalities, Special Study No. 10 for the National Educational Finance Project (Madison, Wisconsin: University of Wisconsin, 1970).

Fiscal capacity and tax effort are two dimensions of the problem of the unequal distribution of financial resources. Fiscal capacity refers to the economic resources of a government or taxing jurisdiction that are available for taxation. Tax effort indicates the extent to which a government is actually using its available resources for tax purposes.

Several researchers have suggested that the degree of tax effort for education is rather closely associated with certain social and economic factors that tend to place the more wealthy and educated in a favored position.[2] These studies have shown that certain socioeconomic variables contributed to the variation in local tax effort of public school districts in several selected states in given years. Thus, if local tax effort for education is a function of certain socioeconomic variables, then one may hypothesize that state effort may also be a function of similar variables. Therefore, the focus of this study was to determine if certain socioeconomic variables combine to influence the effort of states in their support of public education.

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[2] Harold B. Kay, Jr., A Study of the Relationship Between Selected Socio-Economic Variables and Local Tax Effort to Support Public Schools in Kentucky (Ed.D. diss., University of Florida, 1973), and Roe L. Johns and Ralph B. Kimbrough, The Relationship of Socio-Economic Factors, Educational Leadership Patterns and Elements of Community Power Structure to Local School Fiscal Policy, USOE Project No. 2842, May 1968.

Statement of the Problem

The focus of this problem was to determine the relationship between selected socioeconomic variables and state effort in the support of public schools in the fifty states of the United States. The specific aspects of the problem were as follows:

1. To develop two measures of state effort to support education: one, an income-based measure, State Effort Index 1; and the other, a tax-based measure, State Effort Index 2.
2. Using State Effort Index 1 and State Effort Index 2, to determine which variable or variables accounted for the variance in effort among all the states combined, among the states grouped according to above or below average effort, and among the states grouped according to above or below average fiscal capacity.
3. To examine the findings of sub-problems one and two and to compare the results of the two effort indices in terms of the findings and the variables associated with each.

The socioeconomic variables were derived from the literature and research and included variables related to income, public education, demographic characteristics, and other governmental functions.

Delimitations

1. This study was confined to two measures of state effort for education, treated as the dependent variable in each

analysis; both measures were based on the concept of relative use of fiscal capacity.

2. This study was confined to classes of variables, treated as independent, relating to income, public education, demographic characteristics, and other governmental functions.
3. Data relating to these variables, both dependent and independent, were confined to the 1972-73 school year or the corresponding 1973 fiscal year.
4. This study was confined to data collected from the following sources: United States Bureau of the Census, United States Office of Education, National Education Association, Advisory Commission on Intergovernmental Relations, the Institute for Educational Finance, and the Internal Revenue Service.

Limitations

1. There were a number of variables that might have an impact on state effort for education that have been deemed outside the scope of this study.
2. This study, being ex post facto in character, suffers from the usual weaknesses inherent in this method; causal relationships cannot be determined and conclusions cannot be generalized beyond the time for which the data are appropriate.
3. The extremes of local school district tax effort were diluted in a state effort measure which, in essence, merges all districts into a state-wide average effort.

4. The state effort indices are limited by the use of estimated current expenditure figures. These estimates were deemed to be the best available data at the time of their selection. The use of later available figures could possibly change the absolute value of state effort and the relative ranking of the states. The results of the regression equations should not be altered since a national model was used rather than models for individual states.

Justification for the Study

Since the Serrano[3] decision by the California Supreme Court in 1971, there has been an increased interest in school finance reform. The focus of this reform has been on the fiscal disparities existing among the school districts within the states caused by the traditional heavy reliance on the local real property tax. Since education is a state responsibility, it is incumbent upon state policymakers to take action to remedy these fiscal disparities.

Data indicate that variations exist in the fiscal capacity and tax effort among the several states of the United States. If it can be determined that certain socioeconomic variables are related to state effort for education, and if such variables can be controlled by the state, then this study will provide a basis for decision-makers to plan and take action relating to the support of public schools. But, if certain socioeconomic variables influence state effort for education over which the states have no control, then a stronger case could be made for increased federal financial support of public education.

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[3] Serrano v. Priest, 96 Cal. Rptr. 601, 487 P. 2nd 1241 (1971).

As a segment of the ongoing research of the National Educational Finance Project, the first comprehensive study of school finance made since 1933, this study will provide supportive research in the NEFP's efforts to evaluate and improve existing methods for financing education at the state and federal levels. This study should provide further insight into the nature of tax effort.

Assumptions

1. Both economic and tax base indicators provide a valid measure of a state's capacity to finance education.
2. Data secured from appropriate governmental and private sources are valid.
3. No value judgments about the concept of state effort were intended nor should any be implied. Relative effort is simply a tool of comparison.

Definition of Terms

Ability refers to the resources of a government or taxing jurisdiction which have the capacity to support public functions, including education, from the taxes levied on it. In this study the terms ability and capacity were used interchangeably, and were measured by net personal income and an analysis of the results of a Balanced Tax System.

Additional Revenue Potentials are estimates by John Due, University of Illinois, of the revenue potential of state taxes that he felt could best be used to support education.[4] These taxes included sales, personal income, corporate income, cigarette, and liquor. His estimates of additional revenue potential were based on the assumption that the taxes be increased to given rates, the sales tax structure broadened, and tax administration made more effective.

Adjusted Personal Income is a measure of fiscal capacity used by the Advisory Commission on Intergovernmental Relations (ACIR)[5] to reflect all major taxable sources. Adjusted personal income was calculated by multiplying the current personal income in each state by the ratio of the index of estimated tax capacity to the index of residents' personal income. The index of estimated tax capacity and the index of residents' personal income were based on 1966-67 data used in the ACIR's 1971 study of fiscal capacity and effort.[6]

Advisory Commission on Intergovernmental Relations (ACIR) is a permanent bipartisan body representing the executive and legislative branches of federal, state and local government, and the public. It investigates and provides research related to the critical issues involving federal-state, federal-local, and interstate and inter-local relations.

Average Daily Attendence (ADA) is the average of pupils attending when public schools are actually in session.[7] ADA is measured by dividing the aggregate days attended by pupils in a public school by the actual number of days of the school session.

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[4] John Due, "Alternative State and Local Tax Sources for Education," in Public Schools: Educational and Economic Needs by Kern Alexander and K. Forbis Jordan, Editors and Primary Authors (Gainesville, Florida: The University Presses of Florida, in press).

[5] Financing Schools and Property Tax Relief - A State Responsibility (Washington, D.C.: Advisory Commission on Intergovernmental Relations, 1973), pp. 109-10.

[6] Measuring the Fiscal Capacity and Effort of States and Local Areas.

[7] Ranking of the States - 1972 (Washington, D.C.: National Education Association, 1972), p. 13.

Average Daily Membership (ADM) is the average number of pupils belonging, those present plus those absent, when schools are actually in session.[8] ADM is measured by dividing the total number of pupils in membership during a given number of days by the number of days. ADM is based on the assumption that schools must provide teachers, facilities, and materials for all the pupils in membership, whether they are present or absent on a given day.

Balanced Tax System is a tax-based measure of fiscal capacity based on the additional revenue potential estimates of John Due.[9] The Balanced Tax System was developed by adding the estimated additional revenue potential of five common state taxes (sales, personal income, corporate income, cigarette, and liquor) to the actual total tax revenue collected by each state for all taxes.

Current Expenditures from State and Local Own Sources for Education are the total of all expenditures made during a given period of time for education, except expenditures for capital outlay and debt service. This includes expenditures for administration or general control, instruction, operation of plant, maintenance of plant, auxiliary services, and fixed charges. For the purpose of this study, only those state and local expenditures for education made with revenue from own sources were considered. This procedure eliminated any consideration of federal funds.

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[8] Ibid.

[9] Due, "Alternative State and Local Tax Sources for Education."

Effort is a measure quantifying the extent to which a government uses its total fiscal capacity to raise revenues for public purposes. Effort is always expressed in relative terms in this study. Because of the procedures used to estimate fiscal capacity, it is possible to derive relative effort indices for particular sources or uses of revenue.[10] Tax effort is the ratio of tax revenues to estimated tax capacity. Functional effort[11] is a measure of a government's support for a particular public function, such as education. Functional effort is measured as a ratio of the expenditures for a particular function to the government's total fiscal capacity. In this study effort for education was determined by calculating the ratio of state and local current expenditures from own sources per pupil in ADM to total fiscal capacity per pupil in ADM. Fiscal capacity was measured by net personal income and the results of a Balanced Tax System.

Fiscal Capacity and ability were used interchangeably in this study to refer to the total revenue resources available to a government for the support of public functions, including education.

Local Basic Administrative Unit is the local school district, the unit for the operation of public elementary and secondary schools or for contracting for school services.

Multiple Regression Analysis is a statistical method for studying the effects and magnitude of the effects of more than one independent variable on one dependent variable using principles of correlation and regression. The process attempts to explain phenomena by specifying relationships among variables.

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[10] Raymond John Krasniewski, The Derivation and Application of Measures of Revenue Capacity and Relative Effort for Local Governments in Indiana (Ph.D. diss., Purdue University, 1972), p. 14.

[11] Measuring the Fiscal Capacity and Effort of States and Local Areas, p. 114.

Net Personal Income is a measure used to indicate fiscal capacity. It is derived by subtracting from the state's total personal income the amount of federal personal income taxes paid by the residents of the state and by subtracting an amount equal to $750 per person as a subsistence allowance.[12] This measure is based on the assumption that personal income is not wholly satisfactory for measuring fiscal capacity since it ignores the fact that taxpayers must pay federal income taxes and buy the necessities of life.[13]

Personal Income is defined as the current income received by residents of the states from all sources, including transfers from government and business, but excluding transfers among persons. It is a before-tax measure. The total includes nonmonetary income or income received in kind. The figures include income of individuals and also income of nonprofit institutions, private trust funds, and private pension, health, and welfare funds.[14]

Principal Component Analysis is a statistical technique that reduces the dimensionality and eliminates the interaction among a large group of variables. This process creates a smaller number of new variables which are linear combinations of the original ones. These components have the desirable statistical properties of being uncorrelated with each other and explaining a maximum amount of the variance from the original variables.

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[12] Future Directions for School Financing (Gainesville, Florida: National Educational Finance Project, 1971), p. 15.

[13] Ibid.

[14] Ranking of the States - 1972, p. 32.

School Age Population of a state includes those children ages 5 through 17, inclusive. This represents the number of children that should be educated in some kind of school, whether public or private.

Socioeconomic Variables are characteristic measures of a state's social and financial system. For the purposes of this study the reference is to specific variables that measured income, demographic characteristics, public education, and other governmental functions. These variables are listed in Chapter III.

Procedures

This was a cross-section analysis of the relationship between selected socioeconomic variables and state effort to support public schools in all the fifty states during the 1972-73 school year. The socioeconomic variables were specified as independent and state effort for education was the dependent variable. Two measures of state effort were used in the study.

The study was carried out in five phases:

Phase I - Collection of data related to the two specified measures of state effort and calculation of the effort indices.

Phase II - Identification and collection of data related to the socioeconomic variables.

Phase III - The use of the socioeconomic variables in stepwise regression equations having state effort for education as the dependent variable.

Phase IV - A principal component analysis of the socio-economic variables and the calculation of factor scores representing the theoretical dimensions associated with the respective independent factors.

Phase V - The use of the factor scores in stepwise regression equations having state effort for education as the dependent variable.

Phase I - Collection of data related to the two specified measures of state effort and calculation of the effort indices

Data for use in the effort indices were derived for the 1972-73 school year and the corresponding 1973 fiscal year. Data were collected from the U.S. Bureau of the Census, the U.S. Department of Commerce, the Internal Revenue Service, the National Education Association, the U.S. Office of Education, and the Institute for Educational Finance. In the case of conflicting data, the data from official U.S. Government sources were used.

Two measures of state effort for education were used in this study. One measure was based on income and the other on tax bases. Both methods provided alternative approaches for measuring and comparing state effort. The general formulae for the state effort measures were:

$$\text{State Effort Index 1} = \frac{\text{State and Local Educational Expenditures Per Pupil in ADM}}{\text{Net Personal Income Per Pupil in ADM}}$$

$$\text{State Effort Index 2} = \frac{\text{State and Local Educational Expenditures Per Pupil in ADM}}{\text{Balanced Tax System Per Pupil in ADM}}$$

Following the computation of state effort for education using the two formulae, the fifty states were then placed in rank order according to their respective effort.

Phase II - Identification and collective of data related to the socioeconomic variables

Variables which might have a relationship to state effort for education in the fifty states were identified after a review of the literature and research. The variables identified were representative of income, demographic characteristics, public education, and other governmental functions. Data related to these variables were collected for the 1972-73 school year and the 1973 fiscal year from the U.S. Bureau of the Census, the National Education Association, the U.S. Office of Education, and the Institute for Educational Finance.

Phase III - The use of the socioeconomic variables in stepwise regression equations having state effort for education as the dependent variable

The twenty-eight socioeconomic variables were specified as independent and used in stepwise regression equations. State effort for education, as measured by two effort indices, was the dependent variable in each regression equation. According to Cooley and Lohnes,[15] stepwise regression procedures are methods which add or subtract one predictor at a time to the regression equation in accordance with the significance of their contribution to the prediction of the criterion variable. This regression technique was used with each measure of state effort for all the states combined, for the states grouped according to above or below average effort, and for the states grouped according to above or below average fiscal capacity.

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[15] William W. Cooley and Paul R. Lohnes, Multivariate Data Analysis (New York: John Wiley and Sons, Inc., 1971).

Phase IV - A principal component analysis of the socioeconomic variables and the calculation of factor scores

Because of the possibility that many of the independent variables were highly intercorrelated, representing different aspects of the same underlying factor, the identified socioeconomic variables were subjected to principal component analysis. According to Guertin and Bailey,[16] the principal component analysis is appropriate to provide a reduction in the number of variables to be used for prediction or description. Principal component analysis is a form of factor analysis that is used with a large group of independent variables to reduce their dimensionality and eliminate the interactions. This technique creates a smaller number of new variables (factors) which are linear combinations of the original ones. These components have the statistical properties of being uncorrelated with each other and explaining a maximum amount of the variance from the original variables.[17] Based on the results of the principal component analysis, factor scores for each state were computed. Factor scores are statistical constructs which represent the theoretical dimensions associated with the respective uncorrelated factors.

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[16] Wilson H. Guertin and John P. Bailey, Jr., Introduction to Modern Factor Analysis (Ann Arbor, Michigan: Edwards Brothers, Inc., 1970), p. 148.

[17] George B. Pidot, Jr., "A Principal Components Analysis of the Determinants of Local Government Fiscal Patterns," The Review of Economics and Statistics, vol. 51 (May 1969), p. 180.

Phase V - The use of the factor scores in stepwise regression equations having state effort for education as the dependent variables

The factor scores were added to the original variables list as new variables to be used in subsequent statistical analysis. Stepwise regression equations using the factor scores as the independent variables were calculated for the same combination of states as was done in Phase III. State Effort Index 1 and State Effort Index 2 remained the dependent variables in the regression equations. This procedure provided information as to the impact of a reduced number of uncorrelated factors on the explanation of the variance in state effort for education among the fifty states.

Organization of the Research Report

The proposed research will be reported in five chapters. Chapter I contains the statement of the problem and procedures. Chapter II contains the review of related literature and research. The procedures of the five phases of the research are presented and discussed in Chapter III and the data are presented. Chapter IV analyzes the results of the statistical procedures and presents summaries and comparisons of the findings. Chapter V contains the summary of findings, conclusions, and recommendations for further study.

CHAPTER II

REVIEW OF RELATED LITERATURE AND RESEARCH

The focus of this study was on the relationship between state fiscal effort for public education and a variety of socioeconomic variables. The purpose of this chapter was to review the relevant literature and research to identify variables that might be related to state fiscal effort.

A related purpose of this chapter was to provide a brief review of the concepts of fiscal capacity and tax effort. Because alternative measures may be used to express fiscal capacity and tax effort, it is helpful to understand what the measures are, how they differ, and how they are used.

The literature and research in this review included studies of fiscal capacity and tax effort, socioeconomic determinants of school expenditures, and variables influencing tax effort.

Fiscal Capacity and Tax Effort

The concept of tax effort requires a determination of the fiscal capacity of the jurisdiction in question. Tax effort must always be considered in relation to fiscal capacity, since, by definition, tax effort is a ratio of tax revenues to some measure of capacity.[1]

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[1] Measures of State and Local Fiscal Capacity and Tax Effort (Washington, D.C.: Advisory Commission on Intergovernmental Relations, 1962), p. 3.

Fiscal Capacity

The terms tax ability and fiscal capacity have been used interchangeably throughout this chapter. However, the Advisory Commission on Intergovernmental Relations (ACIR) has distinguished between the terms.[2]

Fiscal capacity is generally thought of as being the total economic resources available to a government for tax purposes. Tax effort measures indicate how much of this capacity the government is actually using in the support of public functions.

Two general approaches have been used in measuring fiscal capacity. One approach uses economic indicators, primarily measures of income or wealth, and compares the various states on the basis of such indicators. The other approach measures the tax bases available within a state and provides comparisons based on the revenues that could be raised against given rates of taxation or the revenues derived from the application of a model or representative system.[3]

Examples of both approaches to measuring fiscal capacity were found in the literature on school finance. During the early part of the present century there was considerable interest among school finance theorists in ascertaining the total financial ability of the states to support public education. This interest has continued to the present time as many states have been under pressure to increase their share of the financial support of public schools.

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[2] To the ACIR "fiscal capacity" includes revenue from both tax and nontax sources, while "tax capacity" refers only to revenue derived from tax sources. See Allen D. Manvel, "Tax Capacity Versus Tax Performance: A Comment," National Tax Journal (June 1973), pp. 293-94.

[3] Measures of State and Local Fiscal Capacity and Tax Effort, p. 4.

In 1905, William T. Harris,[4] the United States Commissioner of Education, determined the financial ability of the states as the amount of assessable wealth per capita. Based on this ability measure, he determined fiscal effort for education as the state's expenditures for public schools (excluding debt paid) on each $100 of the true valuation of real and personal property.

Strayer and Haig,[5] in their study of school finance in New York in 1923, calculated an index of economic resources as a measure of ability. The amount of taxable income per county was added to one-tenth of the full value of the countys' real estate, and the sums divided by two to produce the indices of economic resources of the several counties of New York State.

Norton[6] in 1926 developed an index of the ability of the states to support education. He defined economic resources or ability as income plus one-tenth of the value of wealth. Norton used the states' current income averaged over a three-year period, plus one-tenth the value of the tangible property in the states. This measure was similar to that developed by Strayer and Haig for use with the counties in New

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[4] William T. Harris, "Some of the Conditions Which Cause Variations in the Rate of School Expenditures in Different Localities," Proceedings, 1905 (Washington, D.C.: National Education Association, 1905), p. 205-7.

[5] George D. Strayer and Robert M. Haig, The Financing of Education in the State of New York, Educational Finance Inquiry Commission, vol. 1 (New York: The Macmillan Co., 1923), p. 172.

[6] John K. Norton, The Ability of the States to Support Education (Washington, D.C.: National Education Association, 1926), p. 17.

York State. The major differences were that Norton used current income averaged over a three-year span rather than the income for a single year and he did not divide the final sum of resources by two as did Strayer and Haig.

During the 1930s the emphasis shifted from combinations of income and wealth as measures of the ability of the states to support education to the use of tax-based models. The use of tax-based indices of ability appeared to be based on the assumption that the wealth and income of a state were available for the support of education only insofar as they might be taxed through a practical system of taxation.[7]

Chism[8] applied a uniform tax system to all the states to measure their relative ability to raise tax revenue. The tax system was based on the model tax plan prepared by the National Tax Association. The general aim of Chism's research was to develop a tax system which would raise approximately the same total amount of tax revenue as was actually raised by the existing state and local tax systems of the forty-eight states as a whole during the period 1922-32.

Newcomer[9] also used the model tax system proposed by the National Tax Association as the basic foundation for computing the relative ability of the states. She used different rates than Chism and included the estimated yields of certain tax sources especially benefitting some of the states: corporation organization, stock transfer, and severances taxes. She excluded inheritance, motor fuel, and auto license taxes that Chism had included in his model tax system.

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[7] Leslie L. Chism, Economic Ability of the States to Finance Public Schools (New York: Bureau of Publications, Columbia University, Teachers College, 1936), p. 5.

[8] Ibid., p. 9.

[9] Cited in Paul R. Mort, Federal Support for Public Education (New York: Bureau of Publications, Columbia University, Teachers College, 1936), pp. 118-20, 304.

Mort[10] developed an index of the relative ability of the states comprising ten economic and population variables. These variables included (1) urban population, (2) value added by manufacturers, (3) farm cash income, (4) postal receipts, (5) retail trade-net sales, (6) motor vehicle registrations, (7) value of net incomes from $5,000 to $25,000, (8) value of net incomes over $25,000, (9) total population, and (10) the theoretical yield of a tax on the authorized capital stock of corporations. Mort asserted that the resulting index of ability followed closely the criteria established by the National Survey of School Finance and was, therefore, more theoretically correct than other models.[11]

During the 1950s personal income per capita became the standard for measuring the relative ability of the states to support education. The use of personal income was based on the economic premise that all taxes are paid from current income or accumulated wealth.[12] Holshouser[13] has concluded that "although other measures of tax capacity have theoretical advantages, probably the best practical measure is personal income." From a practical standpoint, it is much easier to work with personal income figures than to estimate the yield of some model tax system.

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[10] Ibid., p. 192-93.

[11] Ibid., p. 179.

[12] Measures of State and Local Fiscal Capacity and Tax Effort, p. 5.

[13] Eugene C. Holshouser, "State-Local Tax Effort in Georgia," Atlanta Economic Review (June 1970), p. 40.

Some studies have used more refined measures of personal income. The Commission on Intergovernmental Relations[14] in 1955 used disposable income per child as a measure of tax capacity. Disposable income is the income remaining after the payment of all personal taxes. In 1957 Johns[15] calculated the net personal income per capita as a measure of fiscal ability. Net personal income was defined as the amount of state income remaining after the payment of federal personal income taxes and a deduction of $750 per capita for the basic necessities of food, clothing, and shelter. The Educational Policy Commission[16] of the National Education Association (NEA) recommended the net personal income approach as a measure of ability but increased the basic deduction to $800 per capita. The National Educational Finance Project[17] used the net personal income measure with the original $750 per capita subsistence allowance.

In 1962 the ACIR[18] developed a composite income index to measure fiscal capacity. This composite index was based on the assumption that a substantial part of a state's tax revenue is derived from tapping the income stream at other stages in its flow from production to profit-taking. This method groups various state and local taxes into three categories: (1) personal direct taxes, (2) business taxes, and (3) corporation income taxes. Each of these categories was then assigned to its appropriate income flow index: personal direct levies to personal income, business levies to income produced, and corporation net income taxes to corporation income in each state. The final step involved the determination of a weighted average for a combination of the three measures of income for each state. The weights assigned were determined by the proportion of state and local taxes paid out of each source of income.

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[14] Federal Responsibility in the Field of Education (Washington, D.C.: Commission on Intergovernmental Relations, June 1955), pp.66-7.

[15] Cited in Roe L. Johns and Oscar A. Hamilton, Jr., "Ability and Effort of the States to Support the Public Schools" (Gainesville, Florida: National Educational Finance Project, 1970), 15 pp. (Mimeo).

[16] Cited in Marvin D. Alkin, Measurement of State Effort to Support Education, Institute of Government and Public Affairs (Los Angeles, California: University of California, April 1965), p. 11.

[17] Future Directions for School Financing, p. 15.

[18] Measures of State and Local Fiscal Capacity and Tax Effort, p. 29.

The ACIR's 1962 study of fiscal capacity and tax effort[19] was more significant for the development of a "representative tax system" as a measure of fiscal capacity. This approach required the evaluation of the bases available for taxation in each state and the estimation of the amount of revenue that each state could raise if all applied a uniform tax system. The procedure for constructing the uniform tax system was equivalent to computing a weighted average of the tax bases in each state in which the weights used were the aggregate revenues derived from each tax base in 1960. Since the "representative tax system" reflected the actual 1960 state and local tax practice, it gave heavy weight to the property-tax bases (44 percent) and to general and selective sales-tax bases (34 percent) and less weight to other bases such as personal income (7 percent) and corporate income (4 percent).

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[19] Ibid., pp. 88-89.

The ACIR[20] in 1971 measured fiscal capacity of the states as determined by an "average financing system." This approach estimated the revenue capacity of a state by the total amount of both tax and nontax revenues that would result by applying, within each state, the national average rate of each of the various kinds of state and local revenue sources. This method broadened the "representative tax system" used in 1962 by including consideration of the nontax revenues of the areas under study.

In 1973 the ACIR[21] developed an estimate of state and local revenue potential based on personal income adjusted for "tax capacity." This process updated the capacity measure used in the ACIR's 1971 study of capacity and effort. To use a capacity measure that encompassed all major taxable sources, the ACIR took the 1972 personal income data as a current indicator of capacity and adjusted it to reflect the relationship between personal income and the "average financing system" that was used in the 1971 study. This was based on the assumption that the relationship between personal income and the "average financing system" was fairly stable.

Due[22] estimated the additional revenue potential of the states by applying a uniform tax system based on five common state taxes: sales, personal income, corporate income, cigarette, and liquor. He stated that a potential additional tax revenue of $37.7 billion could have been realized in fiscal year 1973 if the above five taxes had been increased to a given rate, the tax structure broadened, and the tax administration made more effective.

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[20] Measuring the Fiscal Capacity and Effort of States and Local Areas, p. 7.

[21] Will S. Myers, "The ACIR Study of State Revenue Potential," A paper presented at the National School Finance Conference, Orlando, Florida, March 18, 1974.

[22] Due, "Alternative State and Local Tax Sources for Education."

Fiscal capacity refers to the total economic resources available to a government for tax purposes. Two primary measures of fiscal capacity have been developed over the years. Personal income or some derivative was one method of measuring fiscal capacity. This was based on the premise that all taxes are ultimately paid from current income or accumulated wealth. Tax-based measures of fiscal capacity have also been used. These models have been used to measure the tax structure of governments and have served as the basis for estimates of the real or potential revenues available. Such models have been based on the assumption that income or wealth could only be tapped through an efficient tax system.

Tax Effort

In a study done for the Social Security Board in 1944, Saundelson and Mushkin[23] described three general concepts of tax effort: tax performance, tax severity, and the relative use of tax capacity. These three concepts are important in that each described a different aspect of tax effort. The concepts are summarized below.

Tax Performance. This measure provides a comparison of tax yields for all levies or from specific types of taxes, thus, showing comparative trends in tax collections and a state by state distribution of total tax yields. The yields of state and/or local taxes on a per capita basis are often used. This tax index indicates the tax yields in absolute amounts or on a relative basis, with no specific relation to the fiscal capacity of the state or local jurisdiction or the tax burdens that fall on the citizens.

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[23] Wilner Saundelson and S. J. Mushkin, The Measurement of State and Local Tax Effort, Bureau Memorandum No. 58 (Washington, D.C.: Social Security Board, June 1944), p. 3.

Tax Severity. This measure compares the relative loads or burdens assumed by or falling upon the taxpayers within various jurisdictions by relating taxes paid to selected measures of taxpaying ability, usually, income. This provides insight into the effect of a tax program upon individuals or families, industrial or business groups, or various income groups.

Relative Use of Tax Capacity. This measure indicates the relative degree to which taxing authorities exploit or utilize their tax capacity. This index does not indicate how the tax burdens are distributed or the differences in tax loads carried by individuals or by business groups. Measurements of tax capacity may attempt to recognize individual differences in the tax bases available to various jurisdictions and the degree of their exploitation. Effort studies based on this concept describe the extent to which different jurisdictions use their political and legal opportunities for taxation.

In this study the measures of state effort for education were based on the concept of the relative use of tax capacity. The literature and research reviewed in this chapter focused on this particular concept of tax effort.

Tax effort has been defined as a measure quantifying the extent to which a government actually uses its fiscal capacity to raise revenue through taxation.[24] Measures of tax effort involve a ratio of tax revenues to some measure of fiscal capacity as indicated by the following general formula:

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[24] Measures of State and Local Fiscal Capacity and Tax Effort, p. 3.

$$\text{Tax Effort} = \frac{\text{Tax Revenues}}{\text{Fiscal Capacity}}$$

However, since states derive their educational funds from general revenue sources, and not from specific tax revenues, there is no state tax effort per se for education. State effort for education has generally been measured as a ratio of educational expenditures to a measure of fiscal capacity. The ACIR[25] has described this type of measure as functional effort. Functional effort was defined as the expenditures from state and local sources as a percent of overall fiscal capacity. The total of state and local expenditures from own sources was used for two reasons: (1) to overcome the problem associated with the differences in the division of financial responsibilities between the states and their local school districts, and (2) to eliminate all federal funds.

The use of this measure of functional effort permits comparisons among states as to their relative support of various governmental functions, including public education. Tax effort is a more inclusive term describing a government's use of its fiscal capacity to raise tax revenues for all governmental purposes.

In one of the first major studies of tax effort, Ashby,[26] in 1936, described the general measure of state effort as a ratio of the amount spent for education to the financial resources of the state. For the amount spent portion of his effort index, Ashby used the total expenditures of the state and local school districts exclusive of interest charges plus the cost of the state departments of education less the federal funds and subsidies. In the denominator of the index he used the measures of tax resources as calculated by both Chism and Newcomer. Ashby cited four limitations to the effort formula that he proposed:

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[25] Measuring the Fiscal Capacity and Efforts of State and Local Areas, p. 114.

[26] Ashby, "The Efforts of the States to Support Education as Related to Adequacy and Ability," p. 155.

1. Failure to recognize variations in the ratio of total government needs to tax resources.
2. Failure to allow for variations in the ratio of needed educational services to other government needs.
3. Failure to account for differences in standards of living in the various states.
4. Failure to account for the varying costs of a given standard of living due to differences in the price range.

Saundelson and Mushkin,[27] in a study done for the Social Security Board in 1944, made a comprehensive analysis of the concepts and measurements of state and local tax effort. They used as a measure of tax effort a ratio of current yields of various tax bases to the actual values of that tax base. The fiscal capacity portion of their index was similar to the model tax program suggested by both Chism and Newcomer, for it relied on multiple tax bases. Saundelson and Mushkin used the value of the actual tax bases available. They asserted that the subjectivity of the model tax plan would be removed by the use of existing tax programs rather than a model or theoretically desirable tax base.

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[27] Saundelson and Mushkin, The Measurement of State and Local Tax Effort, p. 82.

In a study of the relationships between centralization, ability, and effort in school finance among the continental states, Ratliff[28] used, as his measure of effort, public school expenditures as a percent of personal income. Ability was determined by the personal income per pupil enrolled in the public schools. Centralization was defined as the percent of total state and local revenues from the state. He concluded that, among the continental states, those exerting the greatest effort to support public education had the least ability and those with the least ability tended to have the greatest degree of centralization.

In a paper for the National Conference on School Finance in 1965, Alkin[29] proposed a modification of the traditional effort formula. This modification consisted of the use of an allocation factor along with the measure of fiscal capacity in the denominator of the effort formula. The modified formula was:

$$\text{Effort} = \frac{\text{Expenditure}}{\text{Allocation Factor x Fiscal Ability}}$$

The expenditure portion of the formula represented current expenditures for general control, instructional services, operations, maintenance, and fixed charges at state, intermediate, and local levels of administration. Fiscal ability was defined as personal income of the state as measured by the Department of Commerce.

Alkin proposed three different allocation factors for use in the effort formula.[30] The first allocation factor was a constant equal to the national average percent of income devoted to education. This was based on the assumption that all states should have been expected to spend the same proportion of their personal income for education. The second factor was a constant equal to the ratio of public school children to the total population in a state. This assumed that the percent of the state's fiscal ability which was "expected" to be devoted to public education should be proportional to the percent of public school children in the total population of the state. The third allocation factor was based on the theoretical division of a state's total fiscal ability between schools and all other purposes (including feeding, clothing, and housing the total population of the state) in proportion to public school attendance and total population.

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[28] Charles E. Ratliff, Jr., "Centralization, Ability and Effort in School Finance," National Tax Journal (March 1960), p. 41.

[29] Marvin C. Alkin, Measurement of State Effort to Support Education, Institute of Government and Public Affairs (Los Angeles, California: University of California, April 1965), p. 5.

[30] Ibid., p. 12-15.

Johns and Morphet[31] have recommended a tax effort measure based on the percentage of personal income devoted to current expenditures for schools. The use of current expenditures eliminates the variations that occur when capital outlay requirements are included. Capital outlay needs are likely to vary greatly from state to state and year to year.

The NEFP[32] has used two measures of state effort to support education. Both were based on the assumption that state revenue is largely based on net personal income. The measures of state effort used by the NEFP were:

1. The percentage of net personal income devoted to elementary and secondary schools.

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[31] Roe L. Johns and Edgar L. Morphet, The Economics and Financing of Education: A Systems Approach (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1969), p. 184.

[32] Future Directions for School Financing, p. 16.

2. The percentage of the tax revenues of the state and local governments that goes to education.

The ACIR[33] in 1962 measured tax effort of the states according to the income and the representative tax system approach. The income approach measured tax effort as a ratio of tax revenues to various income indicators: personal income, income produced, corporate income, and a composite income index. Tax effort was also measured as a ratio of tax revenues to the fiscal capacity as determined by a representative tax system.

In 1971 the ACIR[34] measured tax effort as the ratio of tax revenues received by state and local governments to the total revenue capacity of the states as determined by an average financing system. The average financing system included consideration of both tax and non-tax revenues.

The ACIR[35] in 1973 updated the fiscal capacity measure used in its 1971 study. Personal income for 1972 was adjusted by the ratio of the ACIR capacity index to the personal income index based on the 1966-67 data that was used in the 1971 study. The adjusted personal income figures were then used as the measure of fiscal capacity. Relative tax effort was determined by the total state and local tax collections for 1972-73 as a percentage of adjusted personal income.

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[33] Measures of State and Local Fiscal Capacity and Tax Effort, p. 75-76.

[34] Measuring the Fiscal Capacity and Efforts of States and Local Areas, p. 7.

[35] Myers, "The ACIR Study of State Revenue Potential," p. 5.

As many studies indicated, personal income, or one of its derivatives, is probably the most widely used measure of tax capacity in tax effort indices. However, the major problem that has occurred when using the personal income measure is that it tends to understate the actual tax capacity of certain areas. An understatement of tax capacity has the effect of inflating the tax effort index, thus showing that some areas are making a higher level of effort than they actually are in terms of tax ability. This is especially true in those states that are able to shift the incidence of various taxes to nonresident consumers. An example of this has occurred in tourist states, such as Florida, that rely heavily on sales taxes.

> . . . in an area with a large volume of tourist trade, heavy reliance on sales taxes may load onto nonresident visitors a considerable fraction of the financing of public requirements. For such an area one might find a comparatively high measure of relative revenue effort, even though locally borne tax burdens are only average or even low.[36]

According to the ACIR study of state revenue potential, personal income also understated the true taxable base of oil and mineral-rich states like Louisiana, Texas, and Wyoming because of their ability to tax certain captive industries.[37]

This argument, though, draws a fine distinction between the concepts of tax effort and tax burden. However, the problem of the understatement of fiscal capacity by the traditional personal income measures must be recognized.

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[36] Ibid.

[37] Ibid.

To compensate for this particular shortcoming of personal income capacity measures, Sparkman[38] has determined state effort for education by relating state and local current expenditures from own sources for public education (K-12) to fiscal capacity as measured by a Balanced Tax System. The Balanced Tax System was based on the additional revenue potential estimates of John Due.[39]

Tax effort was defined as a measure quantifying the extent to which a government uses its fiscal capacity to raise revenues through taxation. Many measures of tax effort have been developed but the majority seem to rely on the concept of the relative use of fiscal capacity. Measures of tax effort provide a tool for comparing the performance of state and local governments in their support of public education.

Variables Related to School Expenditures

Although school expenditures may provide a rough indication of a state's effort to support education, they do not actually measure it.[40] However, it is possible that certain socioeconomic variables that affect one could influence the other.

The field of economics has produced the greater number of studies of the determinants of public expenditures, including educational expenditures. According to Bahl,[41] there are three reasons accounting for the proliferation of these studies: (1) the lack of a general theory to explain the pattern of expenditure variation among governmental units, (2) the existence of large amounts of comparable published fiscal data for state and local governments, and (3) the appeal and simplicity of the regression technique used as the primary statistical method in the studies.

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[38] William E. Sparkman, "Tax Effort for Education," in Public Schools: Educational and Economic Needs.

[39] Due, "Alternative State and Local Tax Sources for Education."

[40] Johns and Morphet, The Economics and Financing of Education, p. 184.

The determinant studies have generally focused on per capita state and local expenditures for all government purposes. However, most of the studies also included a separate analysis of education spending since this function has accounted for such a large proportion of the public budget.[42]

In one of the first studies of the determinants of public expenditures, the students of Professor Gerhard Colm[43] in 1935 sought to determine whether any relationship existed between the amount of public expenditures and the socioeconomic variables of the states as indicated by density, urbanization, industrialization, and per capita income. They used scatter diagrams and simple correlations with 1929-32 data. The variables of income, industrialization, and urbanization were significantly correlated with per capita total public expenditures.

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[41] Roy W. Bahl, "Studies on Determinants of Public Expenditures: A Review," in Sharing Federal Funds for State and Local Needs: Grants-In-Aid and PPB Systems by Selma J. Mushkin and John F. Cotton (New York: Praeger Publishers, 1969), p. 185.

[42] Ibid.

[43] Lucy Edelberg, Arthur L. Horniker, Berthold Kaufmann, and Charles D. Stewart, "Public Expenditures and Economic Structure in the United States," Social Research (February 1936), pp. 57-77.

Only a negligible correlation was found between density and per capita expenditures.

For the functional area of public education, the cost per pupil in average daily attendance (ADA) tended to increase in the more industrialized states. In city schools, the cost per pupil rose with the size of the city. On the question of density, they found mixed results. For the country as a whole, they found a higher cost per pupil in city schools than in rural schools. However, in some states they found higher pupil costs in the rural schools. No findings related income to per pupil costs.

Although the researchers made simple correlations between the variables and public expenditures, they were not able to draw any definite conclusions as to the effect of the socioeconomic variables upon the size of expenditures. However, they observed that public expenditures were determined, not only by social and economic elements, but also by many political and personal factors.[44]

Berolzheimer[45] in 1947 conducted an exploratory study of factors that tended to influence state and local expenditures. He used 1940 data and provided comparisons rather than statistical correlations. He compared selected socioeconomic variables to the cost of the functional categories of government operation, including public schools.

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[44] Ibid.

[45] Josef Berolzheimer, "Influences Shaping Expenditure For Operation of State and Local Governments: Relation of Population to Expenditure Variation," Bulletin of the National Tax Association (March 1947), pp. 170-77; "Influences Shaping Expenditure For Operation of State and Local Governments: Relation of Income and Public Employment to Expenditure Pattern," Bulletin of the National Tax Association (April 1947), pp. 213-219; "Influences Shaping Expenditure for Operation of State and Local Governments: Functional and Composite View and Reporting Needs," Bulletin of the National Tax Association (May 1947), pp. 237-44.

The states with the highest and lowest population density tended to have above-average costs for school operations. Also, in general, school costs tended to vary with income payments.[46]

The seminal work in the current generation of determinant studies was that of Soloman Fabricant[47] in 1952. He used multiple regression analysis to account for the variation in per capita state and local government expenditures that could be attributed to the variables of income, urbanization, and density. Using 1942 data, he found that all three independent variables accounted for 72 percent of the variance in per capita total expenditures.[48] For school expenditures, he found that the three variables accounted for 59 percent of the variance among the states. He concluded that interstate differences in income were primarily responsible for expenditure differentials among the states.[49]

Fisher[50] in 1961 used multiple regression analysis to compare the "expected" and the actual expenditures of the several states. Using 1957 data, his dependent variable was per capita expenditure of state and local governments and the independent variables were income, urbanization, and population density. The three variables accounted for 53 percent of the variance in per capita total expenditures and

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[46] Ibid., p. 239.

[47] Soloman Fabricant, The Trend of Government Activity in the United States Since 1900 (New York: National Bureau of Economic Research, 1952).

[48] Ibid., p. 123.

[49] Ibid., p. 127.

[50] Glenn W. Fisher, "Determinants of State and Local Government Expenditures: A Preliminary Analysis," National Tax Journal (December 1961), pp. 349-55.

62 percent of the variance in per capita school expenditures.[51] He suggested that the percentage of students attending parochial schools should be used as a predictor variable in the regression equation for public schools. He concluded that income was much more important than were the other variables.[52]

Kurnow[53] in 1963, after examining the works of Fabricant[54] and Fisher,[55] recommended a joint effects regression model. He asserted that the models used in the earlier studies assumed that the relationship among the independent variables was additive. The joint effects model, according to Kurnow, determined the change in per capita expenditures for any combination of predictor variables rather than the separate effect of each one.

Using the joint effects regression model and the same predictor variables as Fabricant, Kurnow was able to account for 88 percent of the variance in expenditures. When Kurnow used 1957 data and the same three predictor variables as Fisher, he explained 78 percent of the variance in expenditures; whereas, Fisher accounted for only 53 percent of the variance.[56]

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[51] Ibid., pp. 350, 353.

[52] Ibid., pp. 353, 355.

[53] Ernest Kurnow, "Determinants of State and Local Expenditures Reexamined," National Tax Journal (March 1963), pp. 252-55.

[54] Fabricant, The Trend of Government Activity in the United States Since 1900.

[55] Fisher, "Determinants of State and Local Government Expenditures: A Preliminary Analysis."

[56] Kurnow, "Determinants of State and Local Expenditures Reexamined."

Kurnow selected four predictor variables for investigation: per capita personal income, urbanization, per capita federal aid, and student-teacher ratio. When these four variables were used in the joint effects regression model, 81 percent of the variance in state and local expenditures was explained.[57]

In 1964 Fisher[58] made a more extensive study of the relationship between selected variables and per capita total and functional governmental expenditures. He expanded the number of independent variables in an attempt to explain a greater percentage of the 1960 variation in expenditures. Using multiple regression analysis, twelve predictor variables were originally selected, but five were dropped when preliminary analysis indicated overlapping. The variables were classified into three categories: economic, demographic, and socio-political.

For local schools, the seven independent variables accounted for 66 percent of the variance in per capita school expenditures.[59] When the three basic variables (income, urbanization, and density) were applied by Fisher, the amount of variance explained only declined to about 62 percent.[60] Fisher also substituted several related measures for percent of families with incomes under $2,000. For local schools, the percent of families with incomes less than $3,000 increased the explained variance to almost 68 percent; the percent of families with incomes less than $5,000 increased the explained variance to 71 percent; the percent of families with incomes from $2,000 to $5,000 increased the explained variance to 69 percent.[61] The independent variables, in order of importance, were: the percent of families with incomes less than $2,000, the yield of the ACIR's representative tax system, increase in population from 1950-60, and the population per square mile. Based on the multiple partial coefficients of determination, the demographic variables were more important, as a group, than the economic or the sociopolitical variables in explaining the variance in per capita local school expenditures.[62]

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[57] Ibid., p. 254.

[58] Glenn W. Fisher, "Interstate Variation In State and Local Government Expenditures," National Tax Journal (March 1964), pp. 57-74.

[59] Ibid., p. 64.

[60] Ibid.

Spangler[63] investigated the effect of population growth upon state and local government expenditures, in total and by functional category. His method was to compute the regression of per capita expenditures in the terminal year upon the percentage change in population over some period of time. For the category of public education in 1960, the rate of population growth accounted for almost 69 percent of the variance in per capita educational expenditures.[64]

Sacks and Harris[65] studied the impact of federal and state grants on the level of state and local government expenditures for

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[61] Ibid., p. 68.

[62] Ibid., p. 71.

[63] Richard Spangler, "The Effect of Population Growth Upon State and Local Government Expenditures," National Tax Journal (March 1963), pp. 193-95.

[64] Ibid., p. 194.

[65] Seymour Sacks and Robert Harris, "The Determinants of State and Local Government Expenditures and Intergovernmental Flow of Funds," National Tax Journal (March 1964), pp. 75-85.

1960. They used multiple regression analysis with per capita state and local government expenditures as the dependent variable and the three basic factors (income, urbanization, and density) with federal aid and state aid as the independent variables. The three basic factors accounted for 60 percent of the variance in educational expenditures in 1960.[66] When per capita state aid was added to the three basic factors in the regression equation, the amount of variance that was explained increased to 72 percent.[67] The impact of federal aid on local school expenditures was not calculated. Beta coefficients were used to show the relative importance of the predictor variables in explaining the variation in educational expenditures. Per capita income ranked first in relative importance and state aid was second.[68] They concluded that the fiscal activities of a state-local governmental system could not be explained without reference to the other elements of the overall federal system.[69]

Morss,[70] in an evaluation of several determinant studies, was critical of the use of federal aid as a predictor variable of state and local expenditure. He asserted that since states and localities must spend virtually all the federal aid they receive, aid and expenditures could be expected to move together in a statistically significant manner.[71]

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[66] Ibid., p. 76.

[67] Ibid., p. 81.

[68] Ibid., p. 84.

[69] Ibid., p. 85.

[70] Elliot R. Morss, "Some Thoughts on the Determinants of State and Local Expenditures," National Tax Journal (March 1966), pp. 95-103.

[71] Ibid., p. 97.

Pogue and Sgontz[72] conducted a time-series regression analysis in an attempt to determine the factors influencing state and local spending in total and by functional category. The significant variables associated with the variation in local school current expenditures were: income, income distribution, area per student, urban areas 50,000 - 500,000, urban areas over 2,500, population change, and time.[73] These variables accounted for 81 percent of the variance in local educational current expenditures.[74]

Hirsch[75] studied 27 school districts in the St. Louis City-County area to determine the variables associated with total current expenditures of local school systems. His independent variables included: population size, three sociological characteristics, one economic variable, and a simplified scope and quality index. He found that 82 percent of the variation in total current expenditures could be accounted for by the independent variables.[76] The most significant variable was per pupil assessed valuation of property. This was followed by an index of scope and quality of public education, and high school pupils in ADA as a percent of all pupils in ADA.

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[72] Thomas F. Pogue and L. G. Sgontz, "Factors Influencing State-Local Spending: An Extension of Recent Empirical Investigations," Mississippi Valley Journal of Business and Economics (Fall 1968), pp. 72-82.

[73] Ibid., pp. 76-77.

[74] Ibid.

[75] Werner Z. Hirsch, "Determinants of Public Education Expenditures," National Tax Journal (March 1960), pp. 29-40.

[76] Ibid., p. 35.

Miner[77] studied 1,127 local school districts in twenty-one states using a stratified, random sample. He used data derived from the U.S. Bureau of the Census, from questionnaires administered by the U.S. Office of Education, and from original questionnaires submitted to local district officials. His study was a cross-section analysis using 1959-60 data. The statistical technique used was least-squares multiple regression with four dependent variables related to expenditures and twenty-one independent variables specified as demand or supply factors.

Miner found that the levels of state per capita income were the most important positive determinants of total per capita expenditures. However, median family income was found to be negatively related to expenditures, but the proportion of families with incomes of $10,000 or more was positively related. The proportion of children in the population was also found to be positively related to expenditures. The proportion of pupils in secondary grades and the salary of beginning teachers had a positive relation to expenditures. Location of a school district in a Standard Metropolitan Statistical Area and a dependent school district organization both had negative effects on total spending.[78]

Auxiliary services were the most important determinant of both total and local per pupil expenditures. The proportion of families with incomes of $10,000 or more, higher relative secondary school enrollment, and density were positively associated with local expenditures. However, local expenditures responded negatively to state personal income and to a greater proportion of revenues for local schools collected by the state.[79]

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[77] Jerry Miner, Social and Economic Factors in Spending for Public Education (Syracuse, New York: Syracuse University Press, 1963).

[78] Ibid., p. 100.

James, Thomas, and Dyck[80] conducted an extensive study of the determinants of educational expenditures in selected school districts in ten states. Using multiple regression equations, they identified eight social and economic characteristics of a district's population that correlated highly with its expenditures for public education. These variables were: full equalized property value per pupil, median family income, proportion of owner-occupied houses, median years of schooling of the adult population, percent of the working force unemployed, percent of the population nonwhite, proportion of the population in rural areas, and percent of the school age population enrolled in private schools.[81]

James, Kelly, and Garms[82] conducted a series of studies in which they examined the determinants of educational expenditures in 107 of the 119 largest school districts in the United States in 1960. Garms[83] reported the basic findings of that study. The researchers used multiple regression analysis to investigate the impact of sixteen independent variables on the dependent variable, current expenditures per ADA. The predictor variables were selected as measures of ability, demand, and governmental arrangements. The ability and demand variables accounted for 71 percent of the variance in current expenditures. When the governmental arrangement variables were added to the regression equation, the total variance accounted for was increased to only 73 percent. Significant variables, in order of importance, were: percent of labor force unemployed, median family income, percent homeowners, median years of schooling, property valuation per pupil, and percent attending private schools.[84] When a variable for the region of the country in which the districts were located was added to the model, the amount of explained variance in expenditures was increased from 73 to 85 percent.[85]

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[79] Ibid., pp. 100-01.

[80] H. Thomas James, J. Alan Thomas, and Harold J. Dyck, Wealth, Expenditures, and Decision-Making for Education (Stanford, California: School of Education, Stanford University, 1963).

[81] Ibid., p. 83.

[82] H. Thomas James, James A. Kelly, and Walter I. Garms, Determinants of Educational Expenditures in Large Cities of the United States (Stanford, California: School of Education, Stanford University, 1966).

[83] Walter I. Garms, "The Financing Characteristics and Problems of Large City School Districts," Educational Administration Quarterly (Winter 1967), pp. 14-27.

Dye[86] used correlation analysis to determine the independent effect of political and socioeconomic variables on state educational outcomes. He found that per pupil expenditures correlated positively with the four economic development variables: urbanization, industrialization, income, and education. The income measure explained almost 70 percent of the total variance in per pupil expenditures.[87] State effort, defined in terms of educational expenditures as a percent of personal income, was negatively correlated with the four economic development variables. Income and education were both positively correlated with per capita educational expenditures. Dye found that economic variables were more important than political system variables in explaining expenditure variations among the states. He concluded that wealth was the principal determinant of the amount of money a state spends on public education.

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[84] Ibid., p. 23.

[85] Ibid., p. 26.

[86] Thomas R. Dye, Politics, Economics, and Educational Outcomes in the States: A Final Report (Athens, Georgia: University of Georgia, March 1967).

[87] Ibid., p. 7.

Shapiro[88] made a cross-section analysis of educational expenditures among states for the years 1920, 1930, 1940, and 1950. He classified the states into two regions, South and Non-South. He used two dependent variables: one was a measure of current expenditures per pupil for public education, and the other included both public and private educational expenditures. His statistical method was multiple regression analysis. Income was found to have been an important explanatory variable for both expenditure measures in all years in the South. By contrast, income explained none of the variation in public expenditures within the Non-South in 1920 and less than 40 percent of the variance in 1950.[89] However, when other independent variables were included (demographic variables, attendence rate, urbanization, and industrialization), income emerged as highly significant in the Non-South in the explanation of expenditure variation; but it explained nothing in the South.

The total group of independent variables was found to account for 40 to 67 percent of the variance in educational expenditures in the Non-South in the various years. In the South, all the variables accounted for 50 to 80 percent of school spending for the same years.[90]

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[88] Sherman Shapiro, "Some Socioeconomic Determinants of Expenditures for Education: Southern and Other States Compared," Comparative Education Review (October 1962), pp. 160-66.

[89] Ibid., p. 162-63.

[90] Ibid., p. 165.

Booms and Hu[91] used a simultaneous equation model to study the fiscal relationships among 249 urban school districts in California for 1960. The model used was essentially a demand and supply equation system for public expenditures on education. The equation system consisted of an expenditure revenue function. Economic, socioeconomic, and institutional variables were included in the model. Eighty percent of the variance in the demand function (defined as current expenditures per ADA) was explained by the following variables: current community tax income, median family income, median school years completed by adults, student-teacher ratio, density, and state aid.[92]

Ranney[93] analyzed the determinants of school expenditures in large cities with special emphasis on the relationship between city and suburban school expenditures. His regression equation explained 75 percent of the variation in large city expenditures. The independent variables, in order of importance, were: educational expenditures per student of suburban school systems, proportion of the population attending the public school system, state aid for education per student, median family income, and independent school system.[94]

Hendrix and Alkin[95] investigated the impact of the proportion of the population in given age groups on locally derived current expenditures per pupil in ADA. They studied age groups in forty-eight states for the years 1930, 1940, 1950, and 1960. When the given age groups were correlated with current expenditures, 67 percent of the variance in expenditures was explained.

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[91] Bernard H. Booms and Teh-Wei Hu, "Economic and Social Factors in the Provision of Urban Public Education," The American Journal of Economics and Sociology (January 1973), pp. 35-43.

[92] Ibid., p. 40.

[93] David C. Ranney, "The Impact of Metropolitanism on Central City Education," Educational Administration Quarterly (Winter 1967), pp. 24-36.

[94] Ibid., p. 29.

[95] Vernon Hendrix and Marvin Alkin, "Population Age Distributions and Public Education Expenditures," A paper presented at the American Educational Research Association in New York in February 1967.

Pidot[96] studied local government fiscal patterns using principal component analysis and regression analysis. He used principal component analysis to reduce the dimensions of a set of twenty-six independent variables to six underlying factors: metropolitanism, wealth, size, age-poverty, commercial-residential, and stagnation. These factors, along with some direct financial measures, were used as the independent variables in a regression equation to explain differences in local government revenue, expenditure, and fiscal effort patterns in a sample of the core area of the eighty largest SMSAs for 1962.[97] The six factors, state aid, and federal aid accounted for 71 percent of the variation in local current educational expenditures. The factors, in order of importance, were: wealth, metropolitanism, commercial-residential, stagnation, age-poverty, state aid, size, and federal aid.

The economic studies of the determinants of public expenditures, including educational expenditures, have played an important role in stimulating school finance research. The focus of the determinant studies has been to determine the relationship between per capita public expenditures and a number of socioeconomic variables by using multiple regression analysis. Selected studies were reviewed to determine if certain socioeconomic variables that affect public expenditures could also influence state effort for education.

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[96] George B. Pidot, Jr., "A Principal Components Analysis of the Determinants of Local Government Fiscal Patterns," The Review of Economics and Statistics (May 1969), pp. 176-88.

[97] Ibid., p. 188.

Variables Related to Tax Effort

Several studies have been made to identify the determinants of tax effort. These studies have generally been concerned with the socioeconomic variables associated with local tax effort for education. Some of these major studies will be reviewed to see if any of the variables that have been identified as relating to local tax effort might also be related to state effort for education.

Authorities on school finance have often speculated as to the factors influencing tax effort. Johns and Morphet have observed that there are many factors which may influence the tax effort made by the people to support public education:

> . . . [the people's] interest in and attitude toward public education, their "feelings" about government and taxes, the tax structure in the state in which they live, the amounts of taxes they pay for purposes other than public schools, whether they have children or grandchildren in schools, their reaction to the program provided by the schools in the communities in which they live, probably their reaction to the party in power and the kind of leadership provided by prominent legislators and the governor, and so on.[98]

In 1962 the ACIR[99] suggested that possible differences in tax effort could have resulted from differences in population density and urbanization. They also observed that differences could have resulted from the higher cost of essential government services in the urban areas or the differences in the proportion of the population which consisted of the dependent-age groups: the unemployed, the aged, and those with needs for publicly assisted housing.

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[98] Johns and Morphet, The Economics and Financing of Education, p. 185.

[99] Measures of State and Local Fiscal Capacity and Tax Effort, p. 88-89.

Saundelson and Mushkin[100] speculated that the variations in tax effort resulted from state differences in population density and urbanization, racial composition, needs for particular governmental programs, debt position, industrialization, and political forces.

In a study for the U.S. Office of Education, Johns and Kimbrough[101] investigated the interrelationships of socioeconomic factors, educational leadership, and community power structures and the relation of these factors to local financial effort for education. The factors they found associated with high effort districts were high per capita wealth and competitive power structures. Further they found superintendents to be more politically active in resolving both educational and general community issues. Community influentials, teachers, and registered voters were found to be more liberal in civic beliefs. Also in high effort districts a larger percent of the leaders came from the political category, the leaders tended to produce open social systems, and the community influentials participated more in the resolution of civic and educational issues.

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[100] Saundelson and Mushkin, The Measurement of State and Local Tax Effort, p. 101.

[101] Roe L. Johns and Ralph B. Kimbrough, The Relationships of Socio-Economic Factors, Educational Leadership Patterns and Elements of Community Power Structure to Local School Fiscal Policy, USOE Project No. 2842, May 1968.

Low effort districts were characterized as having noncompetitive power structures. Superintendents in these districts were found to be less politically active in resolving either educational or general community issues. Leaders from the economic system tended to dominate the power structure. Further, the leaders were usually native born and tended to be local. The community influentials in the low effort districts tended to produce closed social systems.

Johns and Kimbrough concluded that the evidence in their study indicated that:

> The level of local effort was determined largely by political decisions resulting from the interactions of power systems with each other, conditioned by the beliefs and value systems of the components of their environment and affected only occasionally at the present time by the activities of the superintendent of schools.[102]

An important aspect of their study was that eighty-eight of the 122 school districts in the study followed relatively consistent effort patterns during the eighteen-year time span of the study.[103] They found that the high effort districts continued as high effort districts throughout the time period, that the median districts in general continued to make median effort, and that the low effort districts consistently made low effort. They observed that:

> Conceivably most districts select for themselves a high, low, or median financial effort norm which represents their educational aspiration level. Once a district has established its effort norm, it seems difficult to change it.[104]

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[102] Ibid., p. 193.

[103] Ibid., p. 187.

[104] Ibid., p. 188.

Adams,[105] Hopper,[106] King,[107] and Quick[108] conducted companion research in an attempt to identify socioeconomic variables associated with school district tax effort in selected states during given years. Their studies were part of the larger research project under the direction of Johns and Kimbrough.[109] The same research design was employed since the four studies were replicas. Only school districts with populations of 20,000 or more in the four states (Kentucky, Florida, Georgia, and Illinois) were selected for study. Stepwise multiple regression was the statistical technique used to analyze the data. Average effort was calculated for 1950 and 1960 by dividing local revenue receipts (averaged over three-year periods) by net effective buying income. Local effort was also calculated for 1962-63 by dividing local revenue receipts by the equalized assessed valuation of property.

Adams[110] studied twenty-nine school districts in Kentucky. He used the design and techniques described above. He found that three variables were significantly related to school district tax effort in 1950: state revenue receipts per pupil in ADA, percent rural farm, and median family income. In 1960 only one variable, percent of children ages 14-17 in public or private schools, was significant. When local tax effort was measured by the 1962 property valuations, percent of families with incomes of $10,000 or more and the population per square mile were significantly related to tax effort.

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[105] Perry R. Adams, Socio-Economic Factors Associated with Patterns of School Fiscal Policy in Kentucky (Ed.D. diss., University of Florida, 1965).

[106] Harold H. Hopper, Socio-Economic Factors Associated with Patterns of School Fiscal Policy in Florida (Ed.D. diss., University of Florida, 1965).

[107] Charles Robert King, Socio-Economic Factors Associated with Patterns of School Fiscal Policy in Georgia (Ed.D. diss., University of Florida, 1965).

[108] Walter J. Quick, Socio-Economic Factors Associated with Patterns of School Fiscal Policy in Illinois (Ed.D. diss., University of Florida, 1965).

[109] Johns and Kimbrough, The Relationships of Socio-Economic Factors, Educational Leadership Patterns and Elements of Community Power Structure to Local School Fiscal Policy.

[110] Adams, Socio-Economic Factors Associated with Patterns of School Fiscal Policy in Kentucky.

Hooper[111] investigated thirty-two school districts in Florida. He found that, in 1950, significant correlations existed between tax effort and per capita net effective buying income, percent of families with incomes of $10,000 or more, percent rural farm, and percent of ADA in public schools to total school population. Only one significant variable was found for 1960: percent 65 years old and over in the total population. Three variables were significantly correlated with effort when effort was measured by assessed property valuation: federal revenue receipts per pupil in ADA, state revenue receipts per pupil in ADA, and population per square mile.

King[112] studied thirty-three school districts in Georgia. Percent 65 years old and over in the total population had a significant correlation with local effort in 1950. In 1960, state revenue receipts per pupil in ADA was significant. When assessed property valuation was used to measure effort, federal revenue receipts, state revenue receipts, and population per square mile were all significantly correlated with effort.

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[111] Hooper, Socio-Economic Factors Associated with Patterns of School Fiscal Policy in Florida.

[112] King, Socio-Economic Factors Associated with Patterns of School Fiscal Policy in Georgia.

Quick[113] studied twenty-eight school districts in Illinois. In 1950, per capita net effective buying income and ADA as a percent of total population were significant. Two variables were significant in 1960: ADA as a percent of total population and state revenue receipts. He found that state revenue receipts and percent families with incomes of $10,000 or more were significant when local effort was measured by equalized assessed valuation of property.

In a study of socioeconomic variables affecting local tax effort in Kentucky, Kay[114] identified twenty-four variables to study in relation to local effort. He used stepwise multiple regression as his statistical technique. Five variables accounted for 48 percent of the variance in local effort among all the school districts of Kentucky. They were: percent of property tax from farm, adjusted gross income per child, percent Negro pupils, percent disadvantaged children, and assessed valuation of property per pupil. In the high wealth districts, six variables accounted for 72 percent of the variance: percent property tax paid by residential property, adjusted gross income per pupil, assessed valuation of property, percent of property tax from commerce and industry, percent incomes over $15,000, and percent increase in enrollments. Six variables explained 51 percent of the variance in low wealth districts: percent families with incomes over $15,000, ratio of renter to owner occupied housing, school retention rate, percent families with incomes below poverty, percent students in nonpublic schools, and percent increase in enrollments.

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[113] Quick, Socio-Economic Factors Associated with Patterns of School Fiscal Policy in Illinois.

[114] Harold B. Kay, A Study of the Relationship Between Selected Socio-Economic Variables and Local Tax Effort to Support Education in Kentucky (Ed.D. diss., University of Florida, 1973).

Because of the possibility that many of the variables were intercorrelated, Kay performed a factor analysis to reduce the data to its basic underlying components. Three of the six factors derived from the factor analysis had significant relationships with local tax effort: property wealth and income, urbanization, and stable homeownership. When the factors were used in a regression equation, urbanization explained 35 percent of the variance among all the districts and 51 percent of the variance among the high wealth districts. In the low wealth districts, stable homeownership had a negative relation but explained 25 percent of the local effort variance. Urbanization and the wealth and income factors explained another 12 percent of the variance in the low wealth districts.

As part of a comprehensive analysis of school finance in Indiana, Jordan and Alexander[115] examined tax effort of the local school corporations. They measured tax effort by the adjusted general school fund tax rate. Fifteen social and employment variables were identified as the independent variables for use in a multiple regression analysis. They observed that "little or no predictive value was found among social or employment variables."[116] All variables explained 68 percent of the variance in local tax effort. However, the total school fund tax rate, alone, accounted for 63.5 percent of the variance. The remaining fourteen variables explained only 4.5 percent of the variance in local tax effort. Jordan and Alexander observed that the reasons for variations in school tax effort were "probably more complex than to be simply identified by broad socioeconomic characteristics."[117]

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[115] K. Forbis Jordan and Kern Alexander, Financing the Public Schools of Indiana, A report for the Interim School Finance Study Committee and the Legislative Council, December 1974.

[116] Ibid.

In the past decade several studies have been conducted of the determinants of local school district tax effort. These studies have used multiple regression equations to study the relationship between selected socioeconomic variables and school district tax effort. Individual socioeconomic variables were shown to have had an influence on district tax effort. Although the researchers were able to explain various levels of the variance in tax effort, they cited the influence of idiosyncratic or other nonquantifiable data.

Summary

The primary purpose of this chapter was to review some of the relevant literature and research to identify variables that might be related to state fiscal effort for education. A related purpose was to review the concepts of fiscal capacity and tax effort in order to select an appropriate measure for use in this research.

Fiscal capacity represents the total economic resources of a government or taxing jurisdiction that are available for taxation. There are two general approaches which have been used for measuring fiscal capacity. One approach uses economic indicators, primarily measures of income or wealth. This approach is based on the economic premise that all taxes are ultimately paid from current income or accumulated wealth. The second approach to measuring fiscal capacity is based on the comparison of tax bases available among the various states. Usually a model or representative tax system is used to evaluate the available or potential revenue sources. This approach is based on the assumption that the income and wealth of a state are available for public purposes only insofar as they might be taxed through a practical system of taxation.

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[117] Ibid.

Tax effort is defined as a measure quantifying the relative use of fiscal capacity and indicates the extent to which a government is actually using its available or potential resources for tax purposes. State effort for education is generally measured as the ratio of educational expenditures from own sources to some measure of fiscal capacity. This measure has been described as functional effort because it represents the extent of state financial support for one of the functional responsibilities of state government. Tax effort measures provide useful comparisons for those who are concerned with the relative support of public education. However, such measures explain nothing of the causes of variations in the level of state school support.

Obviously, different variables or factors combine to influence the level of state financial support for education. The literature and research cited in this review have suggested broad classes of variables that have been associated with variations in educational expenditures and effort. Income and wealth, whether measured by personal income, median family income, or the assessed valuation of property, have been shown to be important variables in explaining expenditure and effort variations.[118] Since income and wealth are one indicator of fiscal capacity, it was not surprising that they appeared as the primary determinants of public expenditures and effort.

Variables relating to demographic characteristics have also been cited as important determinants of educational support.[119] These variables are generally indicative of urbanization, density, and population characteristics which tend to reflect the need for public services.

Public education variables have also been shown to have an impact on levels of financial support for education.[120] Such variables reflecting social status or educational attainment might reflect public attitudes, aspirations, or interest in public education. Kay hypothesized that "a well educated person with a high income is more likely to vote for higher school taxes than a poorly educated low-income person."[121]

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[118] Fabricant, The Trend of Government Activity in the United States Since 1900; Fisher, "Determinants of State and Local Government Expenditures: A Preliminary Analysis"; Pogue and Sgontz, "Factors Influencing State-Local Spending: An Extension of Recent Empirical Investigations"; Miner, Social and Economic Factors in Spending for Public Education; Dye, Politics, Economics, and Educational Outcomes in the States: A Final Report; Shapiro, "Some Socioeconomic Determinants of Expenditures for Education: Southern and Other States Compared"; Pidot, "A Principal Components Analysis of the Determinants of Local Government Fiscal Patterns"; Adams, Socio-Economic Factors Associated with Patterns of School Fiscal Policy in Kentucky; and Kay, A Study of the Relationship Between Selected Socio-Economic Variables and Local Tax Effort to Support Education in Kentucky.

[119] Fabricant, The Trend of Government Activity in the United States Since 1900; Fisher, "Determinants of State and Local Government Expenditures: A Preliminary Analysis"; Kurnow, "Determinants of State and Local Expenditures Reexamined"; Spangler, "The Effect of Population Growth Upon State and Local Government Expenditures"; Miner, Social and Economic Factors in Spending for Public Education; Hendrix and Alkin, "Population Age Distributions and Public Education Expenditures"; Pidot, "A Principal Components Analysis of the Determinants of Local Government Fiscal Patterns"; and Kay, A Study of the Relationship Between Selected Socio-Economic Variables and Local Tax Effort to Support Education in Kentucky.

[120] James, Thomas, and Dyck, Wealth, Expenditures, and Decision-Making for Education; Garms, "The Financial Characteristics and Problems of Large City School Districts"; Dye, Politics, Economics, and Educational Outcomes in the States: A Final Report; and Booms and Hu, "Economic and Social Factors in the Provision of Urban Public Education."

Another group of variables within this broad category would be those indicative of school characteristics.[122] These variables might indicate the degree of specific educational needs of the client system present in the states. The impact of nonpublic school attendance would also be a consideration in this category.

A fourth broad group of variables is those related to other governmental functions.[123] Although such variables have been mentioned as possibly influencing state tax effort, they have not been tested in multiple regression equations. It is possible that large expenditures for other governmental functions would tend to divert disproportionate amounts of state tax revenues from public education. Since education is a state responsibility, the financing of public schools must be considered within the framework of the total public economy.

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[121] Kay, A Study of the Relationship Between Selected Socio-Economic Variables and Local Tax Effort to Support Education in Kentucky.

[122] Kurnow, "Determinants of State and Local Expenditures Re-examined"; Sacks and Harris, "The Determinants of State and Local Government Expenditures and Intergovernmental Flow of Funds"; Hirsch, "Determinants of Public Education Expenditures"; Miner, Social and Economic Factors in Spending for Public Education; Booms and Hu, "Economic and Social Factors in the Provision of Urban Public Education"; and Ranney, "The Impact of Metropolitanism on Central City Education."

[123] Saundelson and Mushkin, The Measurement of State and Local Tax Effort; Measures of State and Local Fiscal Capacity and Tax Effort; and Measuring the Fiscal Capacity and Efforts of States and Local Areas.

Several studies also indicated that political variables tended to influence educational expenditures and effort.[124] Since the levels of financial support for education are derived through the political process, it is reasonable to expect that variables reflecting the political system should be influential in determining school financial support. However, several factors have tended to limit the importance of political variables in the studies that have used them as predictors. In the studies that have used political variables in combination with other groups of variables, the political variables have been overshadowed by the impact of other classes of variables. For example, Fisher[125] found that demographic variables were more important, as a group, than either economic or political variables in determining levels of public expenditures. Dye[126] found that economic variables were more important than political variables in explaining expenditure variations among the states. Another problem associated with using political variables has been the difficulty of securing appropriate political data for use in regression models.

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[124] Edelberg, Horniker, Kaufmann, and Stewart, "Public Expenditures and Economic Structure in the United States; Fisher, "Interstate Variation in State and Local Government Expenditures"; Dye, Politics, Economics, and Educational Outcomes in the States: A Final Report; and Johns and Kimbrough, The Relationships of Socio-Economic Factors, Educational Leadership Patterns and Elements of Community Power Structure to Local School Fiscal Policy.

[125] Fisher, "Interstate Variation in State and Local Government Expenditures," p. 70-71.

[126] Dye, Politics, Economics, and Educational Outcomes in the States: A Final Report, p. 19.

The literature and research suggest the following type of variables are related to state effort for education: income, demographic, public education, and other governmental functions.

CHAPTER III

PROCEDURES AND PRESENTATION OF THE DATA

The research for this study was conducted in five phases. Phase I involved the collection of data related to the two specified measures of state effort for education and the calculation of the effort indices. The identification and collection of data related to the socioeconomic variables was the focus of Phase II. Phase III consisted of a series of stepwise regression equations having state effort for education as the dependent variables. The socioeconomic variables were designated as independent. The regression equations were computed for all states combined, the states grouped according to above or below average effort, and the states grouped according to above or below average fiscal capacity. For each category of states, the regression equation was calculated for both State Effort Index 1 and State Effort Index 2. A principal component analysis of the twenty-eight socioeconomic variables was computed in Phase IV and factor scores were calculated. In Phase V, the factor scores were used in stepwise regression equations having the two state effort indices as the dependent variables. The regression equations were calculated for the same combinations of states as in Phase III.

This chapter describes the five phases of the research in detail. The computational and statistical procedures are discussed and relevant data are presented. In each section of this chapter the procedures and data used in each phase of the research are explained.

Measurement of State Effort for Education: The Dependent Variables

This section describes the selection of data and the computation of the two effort indices used as the dependent variables in this study. Two alternative measures of state effort for education were selected. Both were based on the concept of the relative use of fiscal capacity. The general formula for each state's educational effort was:

$$\text{State Effort} = \frac{\text{Educational Expenditures}}{\text{Fiscal Capacity}}$$

The selected measures of fiscal capacity were different in the two effort indices. Index 1 used net personal income as the capacity measure and Index 2 used the results of the Balanced Tax System. Total state and local expenditures from own sources for public schools (K-12) were used in the numerator of both indices. The combination of state and local expenditures was used to avoid the problems associated with differences in the division of financial responsibility between the states and their local school districts. Expenditures from own sources were used to eliminate consideration of federal funds. Since federal aid was exogenous to the state public school system, it should not be included as part of a state's effort for education.

Because there were extreme population differences among the states, both in general population and school age population, it was necessary to reduce the effort indices by some common unit that reflected the need for educational services. This was done so that valid comparisons could be made among the states. The selected unit was per pupil in average daily membership (ADM). Both the numerator and denominator of the effort formulae for each state were divided by the total ADM for that state to arrive at a per unit measure.

ADM is the number of pupils belonging when schools are actually in session. It includes those students present, as well as those absent. The ADM unit was used in this study because it reflected the existing educational demands on the public schools by the client system. It was recognized that the ADM unit disregarded the children not attending any schools, as well as those in private schools. Since the focus of this study was on actual practice, the decision was made that the ADM unit best reflected the actual educational needs of the state that must be met through public school expenditures.

The specific formulae used to measure state effort for education are presented below:

$$\text{State Effort Index 1} = \frac{\begin{array}{l}\text{Total State and Local Expenditures}\\ \text{From Own Sources for Public Schools}\\ \text{(K-12) in 1972-73 Per Pupil in ADM}\end{array}}{\begin{array}{l}\text{Net Personal Income in 1973 Per}\\ \text{Pupil in ADM}\end{array}}$$

$$\text{State Effort Index 2} = \frac{\begin{array}{l}\text{Total State and Local Expenditures}\\ \text{From Own Sources for Public Schools}\\ \text{(K-12) in 1972-73 Per Pupil in ADM}\end{array}}{\begin{array}{l}\text{Results of the Balanced Tax System}\\ \text{in Fiscal 1973 Per Pupil in ADM}\end{array}}$$

As noted above, data for the effort indices were from the 1972-73 school year and the 1973 fiscal year to insure comparability.

State Effort Index 1 (STEFIN 1)

This effort index was an income-based measure. Its use was based on the economic premise that all taxes are generally paid from current income. However, before state and local taxes can be paid, the people must buy the essentials of living (food, clothing, and shelter) and pay federal personal income taxes. Therefore, net personal income was used as the fiscal capacity measure in this effort index.

Net personal income was derived by subtracting from the state's total personal income the amount of federal personal income taxes paid by the residents of the state and also by subtracting an amount equal to $750 per person as a subsistence allowance for the necessities of life. The computation of net personal income is shown in Appendix 1, Part A.

State effort for education was then determined by the ratio of state and local educational expenditures for public schools (K-12) from own sources per ADM to net personal income per ADM. This computation is shown in Appendix 1, Part B. State and local educational expenditures were derived by subtracting the federal revenue receipts for schools from the total current expenditures for elementary and secondary day schools for each state. This was done to insure that the current expenditures were from own sources.

Data used in the above computations were derived from U.S. Government and National Education Association sources. Specific data sources are listed in Appendix 1, Part C.

State Effort Index 2 (STEFIN 2)

The second approach to determining state educational effort was the use of a tax-based measure. The rationale for using this approach was based on the assumption that income or accumulated wealth was available for tax purposes only to the extent that it might be tapped through a practical tax system.

A Balanced Tax System was developed to determine the fiscal capacity of each state. This tax system was a composite of actual state and local tax revenues plus the estimated revenue potentials of certain state taxes. Due[1] has estimated the additional revenue potential of five common state taxes: personal income, corporate income, sales, cigarette, and liquor. His estimates were based on the premise that each state would modify its existing tax structure to include those five taxes levied at given rates and administered more efficiently. Appendix 2, Part A, shows the estimated potential yield of those taxes. According to the ACIR,[2] both the general sales tax and the personal income tax could appropriately be used as a standard to judge state tax effort because thirty-six states used both revenue sources in fiscal 1974.

Estimates of additional revenue potential were added to the total of actual state and local tax revenues for each state in fiscal 1973 to yield the Balanced Tax System. This system reflected actual practice plus estimated revenue potentials. Tax revenues do not constitute the only component of a state government's total revenue system; however, total state and local tax collections accounted for about 80 percent of all state and local general revenues from own sources during fiscal year 1973.[3] This method of calculation provided the elimination of intergovernmental revenue from the federal government. It also eliminated from consideration a variety of nontax revenues in the category of charges and miscellaneous general revenue. The decision was reached that these nontax revenues should not be used in measuring a state's fiscal capacity. The resultant measure of fiscal capacity was based on actual and potential tax collections. The computation of the Balanced Tax System is shown in Appendix 2, Part B.

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[1] Due, "Alternative State and Local Tax Sources for Education."

[2] Federal-State-Local Finances: Significant Features of Fiscal Federalism (Washington, D.C.: Advisory Commission on Intergovernmental Relations, 1974), p. 1.

State Effort Index 2 was calculated by dividing the state and local educational expenditures from own sources for public schools (K-12) per ADM by the results of the Balanced Tax System per ADM. This calculation and the results are shown in Appendix 2, Part C. Appendix 2, Part D, contains the sources of data used in the calculation of State Effort Index 2. A comparison of State Effort Index 1 and State Effort Index 2 was prepared and is shown in Appendix 3. Each state's effort was converted to an index number based on the United States average of 100. States with an effort index above 100 made above average effort for a particular measure and those with an index less than 100 made a below average effort to support public schools. Appendix 4 contains a rank order of the states according to the two measures of fiscal capacity used in this study.

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[3] Governmental Finances in 1972-73 (Washington, D.C.: U.S. Bureau of the Census, 1974), p. 31.

The Identification and Collection of Data Related to the Socioeconomic Variables: The Independent Variables

Twenty-eight independent variables were selected after a review of the related literature and research. They were selected from available data to represent the four categories of variables identified in Chapter II. The following variables were selected for the study:

GOVT	Per capita expenditures for other governmental functions
VAR005	Personal income per capita
VAR006	Percent school revenue from local government
VAR007	Percent school revenue from state government
VAR008	Percent school revenue from the federal government
VAR009	Percent civilian labor force unemployed
VAR010	Nonpublic school enrollment as a percent of total school enrollment
VAR011	Population per square mile
VAR012	Enrollment in Grades 9-12 as a percent of total public school enrollment
VAR013	General revenue sharing funds per capita
VAR014	Per capita expenditures for higher education
VAR016	School age population (ages 5-17) as a percent of total population
VAR017	Percent change in public school enrollment, 1962-72
VAR018	Percent of the population age 25 or older with less than five years of schooling
VAR019	Percent of the population age 25 or older with four or more years of high school

VAR020	Median years of schooling completed by the population age 25 and older
VAR021	Public high school graduates in 1972 as a percent of ninth graders in the fall 1968
VAR023	Local basic administrative units per 10,000 pupils
VAR025	Pupil-teacher ratio
VAR026	Percent increase in the population from 1960-70
VAR027	Percent families with incomes less than poverty level
VAR028	Percent population in Standard Metropolitan Statistical Area (SMSA)
VAR030	Percent population in rural areas
VAR031	Median family income
VAR032	Percent families with incomes of $15,000 or more
VAR034	Percent population nonwhite
VAR036	Percent population age 65 and older
VAR040	Total governmental debt outstanding per capita

Appendix 5 contains a listing of the independent variables according to the previously identified categories: income, public education, demographic, and other governmental functions. The income variables represent the ability of the residents to pay for public education. The public education variables are indicative of the demand for public education and the organization of state school systems. Characteristics of the general population that possibly reflect attitudes towards public schools or those that indicate demands for noneducational services are represented by the demographic variables. Other governmental function variables reflect the use of general revenues for governmental services besides public elementary and secondary education.

Data for these variables were obtained primarily from federal government sources including the Bureau of the Census, the Office of Education, and the Department of Commerce. Data were also obtained from the National Education Association. Specific data sources are listed in Appendix 5.

Examination of the Data

Data used in subsequent statistical analyses were examined to insure that they were appropriate for the statistical procedures to be used. After the independent variables were identified and the specific data were collected, they were subjected to three preliminary statistical procedures that were subprograms of the Statistical Package for the Social Sciences (SPSS). The first procedure used was the subprogram CONDESCRIPTIVES.[4] This subprogram permitted the calculation of nine descriptive statistics for each variable: the mean, standard error, standard deviation, variance, kurtosis, skewness, range, and the minimum and maximum scores. Although linear regression makes no assumption about the distribution of the independent variables,[5] the descriptive statistics were used to check the data and to provide the researcher with an initial understanding of the type of data selected.

The next step was to use the subprogram SCATTERGRAM to identify the relationship between the dependent and independent variables.[6]

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[4] Norman H. Nie, C. Hadlai Hull, Jean G. Jenkins, Karin Steinbrenner, and Dale H. Bent, SPSS: Statistical Package for the Social Sciences, Second Edition (New York: McGraw-Hill Book Company, 1975), pp. 181- 93.

[5] Fred N. Kerlinger and Elazar J. Pedhazer, Multiple Regression in Behavioral Research (New York: Holt, Rinehart and Winston, 1973), p. 47.

[6] SPSS, pp. 292-300.

Scattergrams were plotted and statistics associated with simple regression were computed. These statistics included: Pearson's correlation coefficient (r), the coefficient of determination (r^2), the significance of r, standard error of the estimate, intercept with the vertical axis, and the slope of the regression line. These statistics show the strength and the direction of the relationship between the dependent and independent variables. Visual examination of the scattergrams indicated that there were no nonlinear relationships between the dependent and the various independent variables that would necessitate mathematical transformations for use in a linear model.

The final step in the preliminary analysis of the data was the calculation of Pearson product-moment correlation coefficients for pairs of the variables. The subprogram PEARSON CORR was used to calculate zero-order correlations between all possible pairs of dependent and independent variables.[7] The term zero-order correlation refers to the fact that no controls were made for the influence of other variables. The Pearson product-moment correlation coefficient (r) provides two functions: one, it measures the "goodness-of-fit" of the regression line between the dependent and independent variables; and, two, it measures association, indicating the strength and direction of the linear relationship between two variables. The output of this subprogram is a printed correlation matrix. (See Appendix 6.) By examining this correlation matrix, observations can be made concerning the degree of intercorrelations among the independent variables and the strength and direction of the association between the dependent and independent variables.

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[7] SPSS, pp. 280-90.

Based on the preliminary analyses, selected data were deemed to be appropriate for use in a linear regression model. Mathematical transformations were not necessary for two reasons: (1) the absence of nonlinear relationships between the dependent and independent variables, and (2) the lack of assumptions regarding the distribution of the independent variables. Some data, however, were scaled by a unit measure (100 or 1000) for computational convenience.

Presentation of the Data

As indicated above, a correlation matrix of Pearson correlation coefficients was computed. Zero-order correlations between the dependent variable, State Effort Index 1 (STEFIN 1), and the independent variables and their level of significance as determined by their F-ratios are shown in Table 1.

VAR017 (percent change in public school enrollment, 1962-72) was positively correlated with the dependent variable at the .001 level of significance. Eight other variables were positively correlated with STEFIN 1, but with somewhat lower levels of significance. These variables and their respective levels of significance were: GOVT (per capita expenditures for other governmental functions), .004; VAR020 (median years of schooling completed by the population age 25 and older), .008; VAR019 (percent of the population age 25 and older with four or more years of high school), .012; VAR031 (median family income), .013; VAR032 (percent of families with incomes of $15,000 or more), .015; VAR014 (per capita expenditures for

TABLE 1

ZERO-ORDER CORRELATIONS BETWEEN THE DEPENDENT VARIABLE (STATE EFFORT INDEX 1) AND THE INDEPENDENT VARIABLES

Variables	R	Significance Level
VAR017	.5353	.001
GOVT	.3705	.004
VAR027	-.3501	.006
VAR020	.3410	.008
VAR008	-.3376	.008
VAR019	.3170	.012
VAR031	.3158	.013
VAR032	.3073	.015
VAR014	.3044	.016
VAR025	-.2934	.021
VAR016	.2887	.021
VAR040	.2625	.033
VAR018	-.2439	.044
VAR036	-.2406	.046
VAR034	-.2377	.048
VAR023	-.2337	.051
VAR012	-.2196	.063
VAR010	.2033	.078
VAR026	.1566	.139
VAR009	.1368	.172
VAR013	.1256	.192

TABLE 1 (continued)

Variables	R	Significance Level
VAR006	.1111	.221
VAR011	.1098	.224
VAR021	.0659	.325
VAR030	-.0597	.340
VAR005	.0487	.368
VAR007	-.0239	.435
VAR028	-.0175	.452

higher education), .016; VAR016 (school age population as a percent of total population), .021; and VAR040 (per capita governmental debt outstanding), .033.

Six variables were negatively correlated with STEFIN 1 with levels of significance ranging from .006 to .048. These variables and their significance levels were: VAR027 (percent of families with incomes below poverty level), .004; VAR008 (percent of school revenue from federal government), .008; VAR025 (pupil-teacher ratio), .021; VAR018 (percent of the population age 25 and older with less than five years of schooling),.044; VAR036 (percent of the population age 65 and older), .046; and VAR034 (percent of the population non-white), .048.

Only fifteen of the twenty-eight variables had statistically significant relationships with STEFIN 1 at the .05 level of significance or higher. The remaining thirteen variables had levels of significance beyond the .05 level.

The Pearson correlation matrix also contained the correlations between the twenty-eight socioeconomic variables and State Effort Index 2 (STEFIN 2), the other dependent variable. These correlations are shown in Table 2. VAR017 (percent change in public school enrollment, 1962-72), GOVT (per capita expenditures for other governmental functions), and VAR032 (percent of families with incomes of $15,000 or more) were all positively correlated with STEFIN 2 at the .001 level of significance. For six other variables, positive correlations were found with levels of significance ranging from .005 to .05. The variables and their respective significance levels were: VAR040 (per capita governmental debt outstanding), .005; VAR031

TABLE 2

ZERO-ORDER CORRELATIONS BETWEEN THE DEPENDENT VARIABLE (STATE EFFORT INDEX 2) AND THE INDEPENDENT VARIABLES

Variables	R	Significance Level
VAR017	.4427	.001
GOVT	.4398	.001
VAR032	.4305	.001
VAR036	-.3749	.004
VAR040	.3645	.005
VAR031	.3531	.006
VAR014	.3393	.008
VAR027	-.2885	.021
VAR005	.2818	.024
VAR009	.2659	.031
VAR020	.2358	.050
VAR007	.2288	.055
VAR016	.2241	.059
VAR023	-.2033	.078
VAR021	.1876	.096
VAR012	-.1867	.097
VAR019	.1696	.119
VAR025	-.1577	.142
VAR006	-.1349	.175
VAR008	-.1332	.178
VAR018	-.1265	.191

TABLE 2 (continued)

Variables	R	Significance Level
VAR011	.1184	.206
VAR010	.0913	.264
VAR013	.0847	.279
VAR034	-.0694	.316
VAR028	-.0436	.382
VAR026	.0226	.438
VAR030	.0064	.483

(median family income), .006; VAR014 (per capita expenditures for higher education), .008; VAR005 (personal income per capita), .024; VAR009 (percent labor force unemployed), .031; and VAR020 (median years of schooling completed by the population age 25 and older), .05.

Two variables were negatively correlated with STEFIN 2 with levels of significance above .05. These variables were: VAR036 (percent of the population age 65 and older), .004; and VAR027 (percent of the population with incomes less than poverty level), .021. The remaining seventeen variables had low correlations with STEFIN 2; levels of significance were beyond .05.

A comparison of the zero-order correlations between the socioeconomic variables and the two state effort indices showed that VAR017 (percent change in public school enrollment, 1962-72) and GOVT (per capita expenditures for other governmental functions) had the highest correlations, respectively, with both indices. STEFIN 1 had the larger number of variables (fifteen) that were associated at a statistically significant level which was .05 or higher. Only eleven variables were significantly correlated with STEFIN 2 at the .05 level or higher.

An examination of the correlation matrix indicated that many of the socioeconomic variables were highly correlated with each other. (See Appendix 6.) Nineteen of the independent variables had correlations with each other at the .60 level or higher with levels of significance at .001. VAR027 (percent families with incomes below poverty level) and VAR032 (percent families with incomes of $15,000 and above) intercorrelated with ten and nine other variables, respectively, and with each other at the .60 level or higher. VAR031 (median family income), VAR020 (median years of schooling completed by the population age 25 and older), and VAR018 (percent school revenue from federal government) each intercorrelated with eight other variables at the .60 level or higher and with a .001 level of significance. However, there was little intercorrelation among these three variables. Only VAR018 and VAR020 were intercorrelated at the .60 level or higher with a level of significance of .001.

The Use of the Socioeconomic Variables in Stepwise Regression Equations Having State Effort for Education as the Dependent Variable

Statistical Procedures

The next phase of the research consisted of using stepwise regression equations to analyze the statistical relationship between the dependent variables and a set of independent variables. As previously identified, State Effort Index 1 (STEFIN 1) and State Effort Index 2 (STEFIN 2) were the dependent variables in separate stepwise regression equations.

The stepwise procedure selected the variables for the regression equation one at a time. The variable that explained the greatest amount of variance in the dependent variable was entered first. In the second and each subsequent step, the independent variable chosen for entry was the one which had the largest squared partial correlation with the dependent variable. In other words, the variable that explained the greatest amount of variance unexplained by the variables already in the equation entered the equation at each step.[8]

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[8] SPSS, p. 345.

The subprogram REGRESSION of the SPSS[9] was used to calculate the stepwise regression equations. This subprogram provided three options for determining which variables were to be included in the stepwise mode.[10] Under the first option, the user could specify the maximum number of independent variables that might be entered in the regression equations. For the purpose of this study, each of the twenty-eight independent variables was allowed to enter the equations provided that it met the criteria as specified by the two remaining options. These criteria were related to the value of the F ratio and the tolerance level of the independent variable. If the variable failed to meet these requirements, it was not allowed to enter the regression equation.

At each step in the analysis, F ratios were computed for variables not yet in the equation. The F ratio for a given variable was the value that would be obtained if that variable was brought in on the very next step.[11] If that F ratio was .05 or above, the variable was admitted to the equation.

The third criterion used to include variables in the regression equations was the tolerance index. The tolerance of an independent variable being considered for inclusion was the proportion of the variance of that variable not explained by the independent variables already in the regression equation.[12] Variables with a tolerance index of .30 or greater were allowed to enter the equations.

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[9] Ibid., pp. 320-67.

[10] Ibid., p. 346.

[11] Ibid.

[12] Ibid.

The values of the F ratio and the tolerance index selected for this study ($F \geq .05$; $T \geq .30$) were more conservative than the subprogram's default values of .01 and .001, respectively. The higher values tended to exclude from the regression equation those variables that had little explanatory power.

The stepwise regressions were performed on (1) all fifty states, (2) the states grouped into those above and below average effort of education, and (3) the states grouped into those above and below average fiscal capacity.

A total of ten stepwise regressions was run in this phase of the study. Five categories of state were subjected to the regression procedures:

1. All states combined.
2. States with effort above the national average.
3. States with effort below the national average.
4. States with fiscal capacity above the national average.
5. States with fiscal capacity below the national average.

These categories of states were subjected to two separate stepwise regressions. The first regression used State Effort Index 1 as the dependent variable and the second regression used State Effort Index 2. The same twenty-eight independent variables were used in all regressions.

The possibility of the relatively large number of independent variables in relation to the number of observations tending to bias the results of the regression upward was recognized. However, since no statistical inferences were to be made from the results, this potential weakness was not considered to be a major threat to the findings.

The output from the subprogram REGRESSION consisted of several statistics that were used to describe the relationship between state effort for education and the socioeconomic variables. The first statistic was the multiple correlation coefficient (Multiple R) which was the correlation between a dependent variable and the weighted sum of the independent variables.

The coefficient of multiple determination, R Square (R^2), indicated what fraction of the total variation of the dependent variable was "explained" by the independent variables.[13] As the name of this statistic implied, R Square was the square of the multiple correlation coefficient, R. Cause and effect relationships cannot be established from the R^2 statistic. The importance of this statistic is that it provides a straightforward interpretation of the amount of variation in the dependent variable that can be accounted for by its linear dependence on the independent variables operating together.[14]

The R^2 change statistic measured the amount of change in the R^2 at each successive step in the regression equation. This statistic was used to indicate the point at which the addition of a new independent variable failed to add appreciably to the total amount of variance explained by the variables already in the equation.

The final statistic produced for the summary table of each regression equation was the Simple R which was the zero-order correlation between the dependent variable and the independent variable. The simple correlation indicated the strength and the direction of the relationship between those variables.

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[13] Donald L. Harnett, Introduction to Statistical Methods (Reading, Massachusetts: Addison-Wesley Publishing Company, 1970), p. 347.

[14] SPSS, p. 331.

Presentation of the Data

The first stepwise regression was computed for State Effort Index 1 (STEFIN 1) with the twenty-eight independent variables for all fifty states (Table 3). Seventeen independent variables were allowed to enter the regression equation since the preestablished criteria were not violated ($F \geq .05$ and $T \geq .30$). The seventeen socioeconomic variables had a combined multiple R of .8829 thus explaining about 78 percent of the variance in STEFIN 1 among the fifty states.

VAR017 (percent change in public school enrollment, 1962-72) explained 29 percent of the variance in STEFIN 1 and was positively related to it. VAR016 (school age population as a percent of total population) and VAR025 (pupil-teacher ratio) each explained a little more than 8 percent of the variance in STEFIN 1. Seven additional variables each accounted for more than 1 percent in the explanation of the variance in STEFIN 1. These ten variables cumulatively explained 73 percent of the variance in STEFIN 1 among the fifty states.

The next stepwise regression was computed for State Effort Index 2 (STEFIN 2) with the twenty-eight independent variables for all fifty states (Table 4). Seventeen of the socioeconomic variables were permitted to enter the regression equation; they explained 65 percent of the total variance in STEFIN 2. VAR017 (percent change in public school enrollment, 1962-72) explained nearly 20 percent of the variance in STEFIN 2. However, VAR026 (percent increase in population, 1960-70) explained almost 15 percent of the variance and VAR036 (percent population age 65 and older) accounted for an additional 13 percent of the variance in STEFIN 2. VAR036 was negatively related to

TABLE 3

RELATIONSHIP OF STATE EFFORT INDEX 1 TO TWENTY-EIGHT SOCIOECONOMIC VARIABLES IN FIFTY STATES (STEPWISE REGRESSION)

Variables	Multiple R	R^2	R^2 Change	Simple R
VAR017	0.5428	0.2946	0.2946	0.5428
VAR016	0.6149	0.3781	0.0835	0.2885
VAR025	0.6772	0.4586	0.0805	-0.2938
VAR023	0.7204	0.5189	0.0604	-0.2370
VAR034	0.7482	0.5599	0.0409	-0.2338
VAR005	0.7633	0.5826	0.0228	0.0418
VAR008	0.7962	0.6340	0.0514	-0.3341
GOVT	0.8302	0.6892	0.0552	0.3683
VAR036	0.8457	0.7153	0.0260	-0.2426
VAR007	0.8540	0.7292	0.0140	-0.0089
VAR010	0.8587	0.7374	0.0082	0.2036
VAR020	0.8641	0.7466	0.0092	0.3356
VAR030	0.8696	0.7562	0.0095	-0.0579
VAR021	0.8753	0.7661	0.0099	0.0666
VAR013	0.8787	0.7721	0.0060	0.1296
VAR012	0.8823	0.7785	0.0064	-0.2208
VAR009	0.8829	0.7794	0.0010	0.1320

TABLE 4

RELATIONSHIP OF STATE EFFORT INDEX 2 TO TWENTY-EIGHT SOCIOECONOMIC VARIABLES IN FIFTY STATES (STEPWISE REGRESSION)

Variables	Multiple R	R^2	R^2 Change	Simple R
VAR017	0.4455	0.1985	0.1985	0.4455
VAR026	0.5896	0.3476	0.1491	0.0236
VAR036	0.6880	0.4734	0.1258	-0.3760
GOVT	0.7041	0.4958	0.0224	0.4385
VAR023	0.7182	0.5157	0.0199	-0.2042
VAR007	0.7262	0.5274	0.0117	0.2431
VAR034	0.7455	0.5557	0.0283	-0.0676
VAR005	0.7583	0.5750	0.0193	0.2815
VAR016	0.7679	0.5896	0.0147	0.2265
VAR030	0.7799	0.6082	0.0186	0.0126
VAR012	0.7841	0.6148	0.0066	-0.1868
VAR011	0.7878	0.6207	0.0059	0.1195
VAR014	0.7932	0.6292	0.0085	0.3503
VAR008	0.7952	0.6324	0.0032	-0.1288
VAR009	0.7995	0.6393	0.0069	0.2708
VAR013	0.8029	0.6446	0.0053	0.0885
VAR025	0.8046	0.6475	0.0029	-0.1580

STEFIN 2; whereas, VAR017 and VAR026 were both positively related to it. Seven additional variables each explained more than 1 percent of the total variance in STEFIN 2. These ten variables together explained 61 percent of the total variance.

After the regressions had been run for all fifty states combined using both dependent variables, the computer was directed to select those states with above average effort and those with below average effort according to STEFIN 1. Stepwise regressions were then performed on both groups of states with STEFIN 1 as the dependent variable and the same socioeconomic variables specified as independent (Table 5).

Among the states selected as having above average effort according to STEFIN 1, the eleven variables which met the criteria had a combined multiple R of .8999 and explained 81 percent of the variance in STEFIN 1. VAR030 (percent population in rural areas) accounted for 37 percent of the variance in state effort. VAR021 (public high school graduates in 1972 as a percent of ninth graders in 1968) explained an additional 13.6 percent of the variance. Seven variables each accounted for more than 1 percent of the total variation in STEFIN 1 and together they explained 28 percent of the variance. Since only twenty-four states were selected for this regression, a large percentage of the total variance being explained by the independent variables was not surprising.

Similar results were found among those twenty-six states selected as having below average effort for education according to STEFIN 1 (Table 6). The thirteen variables which met the criteria accounted for 85 percent of the total variance in STEFIN 1. VAR023 (local basic

TABLE 5

RELATIONSHIP OF STATE EFFORT INDEX 1 TO TWENTY-EIGHT SOCIOECONOMIC VARIABLES IN THE STATES WITH ABOVE AVERAGE EFFORT FOR EDUCATION (STEPWISE REGRESSION)

Variable	Multiple R	R^2	R^2 Change	Simple R
VAR030	0.6118	0.3743	0.3743	0.6118
VAR021	0.7145	0.5105	0.1362	-0.4148
VAR027	0.7618	0.5803	0.0698	0.0748
VAR023	0.7876	0.6203	0.0400	0.4710
VAR017	0.8099	0.6560	0.0356	0.3472
VAR008	0.8520	0.7260	0.0700	0.0420
VAR007	0.8636	0.7458	0.0198	0.0442
VAR005	0.8816	0.7773	0.0315	-0.2728
VAR013	0.8864	0.7856	0.0084	0.1563
VAR010	0.8961	0.8030	0.0174	-0.0669
GOVT	0.8999	0.8099	0.0069	0.1555

TABLE 6

RELATIONSHIP OF STATE EFFORT INDEX 1 TO TWENTY-EIGHT SOCIOECONOMIC VARIABLES IN THE STATES WITH BELOW AVERAGE EFFORT FOR EDUCATION (STEPWISE REGRESSION)

Variables	Multiple R	R^2	R^2 Change	Simple R
VAR023	0.4893	0.2394	0.2394	-0.4893
VAR027	0.6458	0.4171	0.1777	-0.3552
VAR016	0.7828	0.6127	0.1956	0.3426
VAR030	0.8238	0.6786	0.0659	-0.0948
VAR012	0.8539	0.7292	0.0505	-0.2255
VAR013	0.8820	0.7780	0.0488	-0.1713
VAR025	0.8952	0.8014	0.0235	0.3477
VAR026	0.9054	0.8197	0.0182	0.2231
VAR040	0.9097	0.8275	0.0078	-0.1533
GOVT	0.9158	0.8388	0.0112	0.3089
VAR011	0.9192	0.8449	0.0062	0.4369
VAR014	0.9207	0.8477	0.0028	-0.0012
VAR036	0.9218	0.8497	0.0021	-0.4568

administrative units per 10,000 pupils) explained 24 percent of the variance. VAR027 (percent families with incomes less than poverty level) explained almost 18 percent of the variance and VAR016 (school age population as a percent of total population) accounted for nearly 20 percent of the total variance.

The states were then selected as being above or below average effort according to STEFIN 2. Stepwise regressions were performed on the two groups using STEFIN 2 as the dependent variable and the twenty-eight independent variables (Table 7). VAR009 (percent civilian labor force unemployed) accounted for almost 46 percent of the variance in state effort and VAR017 (percent change in public school enrollment, 1962-72) explained a further 13 percent. The eleven variables which met the criteria accounted for 95 percent of the variance in state effort. Twenty-three states were selected as having above average effort according to STEFIN 2.

Among the states selected as being below average according to STEFIN 2, the thirteen variables which met the criteria accounted for 78 percent of the variation in state effort (Table 8). VAR026 (percent increase in the population from 1960-70) produced an R^2 of .1335 and was followed by VAR023 (local basic administrative units per 10,000 pupils) with an R^2 of .1016. VAR027 (percent families with incomes below poverty level) explained about 8 percent of the variance. These three variables together accounted for 32 percent of the total variance in STEFIN 2. Each of the first five variables entered in the regression was negatively related to the dependent variable. There were twenty-seven below average effort states according to STEFIN 2.

TABLE 7

RELATIONSHIP OF STATE EFFORT INDEX 2 TO TWENTY-EIGHT SOCIOECONOMIC VARIABLES IN THE STATES WITH ABOVE AVERAGE EFFORT FOR EDUCATION (STEPWISE REGRESSION)

Variables	Multiple R	R^2	R^2 Change	Simple R
VAR009	0.6775	0.4591	0.4591	0.6775
VAR017	0.7680	0.5899	0.1308	0.5729
VAR008	0.8089	0.6543	0.0644	0.1331
VAR018	0.8572	0.7349	0.0806	0.0647
VAR028	0.8920	0.7956	0.0607	-0.3909
VAR013	0.9193	0.8452	0.0496	-0.0981
VAR006	0.9456	0.8942	0.0490	-0.4058
VAR023	0.9615	0.9245	0.0303	-0.0770
VAR021	0.9689	0.9388	0.0143	-0.0006
VAR016	0.9712	0.9433	0.0045	0.1954
VAR040	0.9760	0.9526	0.0093	0.5793

TABLE 8

RELATIONSHIP OF STATE EFFORT INDEX 2 TO TWENTY-EIGHT SOCIOECONOMIC VARIABLES IN THE STATES WITH BELOW AVERAGE EFFORT FOR EDUCATION (STEPWISE REGRESSION)

Variables	Multiple R	R^2	R^2 Change	Simple R
VAR026	0.3653	0.1335	0.1335	-0.3653
VAR023	0.4848	0.2351	0.1016	-0.2726
VAR027	0.5680	0.3226	0.0876	-0.0788
VAR017	0.6038	0.3646	0.0420	-0.2809
VAR014	0.6907	0.4771	0.1125	-0.0359
VAR034	0.7525	0.5663	0.0892	0.0510
VAR009	0.7918	0.6269	0.0606	0.1015
VAR030	0.8446	0.7134	0.0865	0.2404
VAR013	0.8659	0.7497	0.0364	0.0974
VAR025	0.8777	0.7704	0.0207	-0.2115
VAR011	0.8793	0.7731	0.0027	0.2267
GOVT	0.8806	0.7755	0.0024	0.0240
VAR016	0.8818	0.7777	0.0021	0.0382

Next, stepwise regressions were calculated for the states grouped according to above and below average fiscal capacity. The fiscal capacity measure was the denominator portion of each state effort index: net personal income per ADM and the Balanced Tax System per ADM. The regressions were run for states selected as above and below average fiscal capacity. The two state effort indices remained the dependent variables in each regression.

In those twenty-eight states with above average fiscal capacity as measured by net personal income per ADM, the thirteen variables which met the criteria explained 91 percent of the total variance in STEFIN 1 (Table 9). VAR031 (median family income) accounted for 36 percent of the variance and VAR013 (general revenue sharing funds per capita) explained a further 10 percent of the variance.

The twelve variables which met the criteria accounted for 97 percent of the variance in STEFIN 1 among those twenty-two states with below average fiscal capacity as measured by net personal income per ADM (Table 10). VAR017 (percent change in public school enrollment, 1962-72) accounted for 60 percent of the variance in STEFIN 1. VAR028 (percent population in SMSA) explained an additional 15.7 percent of the total variance. After the inclusion of these first two variables, the R square change declined substantially.

The final regressions were run on those states with above and below average fiscal capacity as measured by the Balanced Tax System per ADM. STEFIN 2 was the dependent variable in the two final regressions. The fourteen variables which met the criteria accounted for 88 percent of the variance in STEFIN 2 among those twenty-three states with above average fiscal capacity (Table 11). VAR019 (percent of the population

TABLE 9

RELATIONSHIP OF STATE EFFORT INDEX 2 TO TWENTY-EIGHT SOCIOECONOMIC VARIABLES IN THE STATES WITH ABOVE AVERAGE FISCAL CAPACITY (STEPWISE REGRESSION)

Variables	Multiple R	R^2	R^2 Change	Simple R
VAR031	0.6038	0.3646	0.3646	0.6038
VAR013	0.6832	0.4668	0.1021	0.2614
VAR005	0.7515	0.5648	0.0981	0.1054
VAR023	0.7842	0.6149	0.0501	-0.4489
VAR016	0.8173	0.6680	0.0531	0.5289
GOVT	0.8558	0.7324	0.0645	0.5428
VAR010	0.8808	0.7758	0.0434	0.2549
VAR030	0.9013	0.8124	0.0366	-0.0756
VAR034	0.9117	0.8312	0.0188	-0.0323
VAR020	0.9241	0.8540	0.0227	0.0019
VAR008	0.9408	0.8850	0.0310	-0.2107
VAR021	0.9459	0.8948	0.0098	0.0807
VAR026	0.9520	0.9062	0.0114	0.0494

TABLE 10

RELATIONSHIP OF STATE EFFORT INDEX 1 TO TWENTY-EIGHT SOCIOECONOMIC VARIABLES IN THE STATES WITH BELOW AVERAGE FISCAL CAPACITY (STEPWISE REGRESSION)

Variables	Multiple R	R^2	R^2 Change	Simple R
VAR017	0.7753	0.6010	0.6010	0.7753
VAR028	0.8709	0.7579	0.1569	-0.0887
VAR013	0.8922	0.7960	0.0381	-0.0166
VAR025	0.9064	0.8215	0.0255	-0.5064
VAR036	0.9293	0.8637	0.0421	-0.1452
VAR008	0.9419	0.8872	0.0235	-0.5615
VAR012	0.9659	0.9330	0.0458	-0.2914
VAR020	0.9752	0.9509	0.0179	0.5473
VAR007	0.9794	0.9592	0.0082	-0.3359
GOVT	0.9837	0.9677	0.0085	0.3945
VAR009	0.9840	0.9683	0.0006	-0.0548
VAR031	0.9845	0.9692	0.0008	0.3747

TABLE 11

RELATIONSHIP OF STATE EFFORT INDEX 2 TO TWENTY-EIGHT SOCIOECONOMIC VARIABLES IN THE STATES WITH ABOVE AVERAGE FISCAL CAPACITY (STEPWISE REGRESSION)

Variables	Multiple R	R^2	R^2 Change	Simple R
VAR019	0.5593	0.3128	0.3128	-0.5593
VAR016	0.6924	0.4794	0.1666	0.2380
VAR009	0.7542	0.5688	0.0894	-0.0969
VAR018	0.8081	0.6530	0.0842	0.2504
VAR021	0.8664	0.7507	0.0977	-o.2004
VAR006	0.8886	0.7895	0.0388	-0.1538
VAR030	0.9009	0.8117	0.0222	0.0841
VAR040	0.9120	0.8318	0.0201	0.2339
VAR036	0.9187	0.8440	0.0123	-0.0664
VAR012	0.9226	0.8512	0.0071	-0.1437
GOVT	0.9299	0.8649	0.0137	0.1558
VAR013	0.9341	0.8726	0.0077	0.3903
VAR008	0.9377	0.8793	0.0068	0.0913
VAR023	0.9387	0.8811	0.0018	-0.2980

age 25 and older with four or more years of high school) explained 31 percent of the variation in STEFIN 2. VAR016 (school age population as a percent of total population) accounted for an additional 16.6 percent of the variation. Each of the three additional variables accounted for more than 8 percent of the total variance: VAR009 (percent of the population age 25 and older with less than five years of schooling), 8.4 percent; and VAR021 (public high school graduates in 1972 as a percent of ninth graders in 1968), 9.8 percent.

In those twenty-seven states with below average fiscal capacity according to the Balanced Tax System per ADM, VAR032 (percent families with incomes of $15,000 or more), alone, accounted for 75.7 percent of the variance in STEFIN 2 (Table 12). VAR032 was positively related to STEFIN 2. Only four additional variables explained more than 2 percent each of the variance: VAR011 (population per square mile), 4.4 percent; VAR013 (general revenue sharing funds per capita), 2 percent; VAR008 (percent school revenue from federal government), 2.2 percent; and VAR012 (enrollment in grades 9-12 as a percent of total public school enrollment), 2.3 percent. The eleven variables which met the criteria accounted for 92 percent of the total variation in STEFIN 2 among those states with below average fiscal capacity.

As indicated earlier, caution must be exercised in the interpretation of the results of these latter regressions. The large proportion of the variance accounted for by the independent variables was not surprising because of the small number of observations in relation to the number of variables.

TABLE 12

RELATIONSHIP OF STATE EFFORT INDEX 2 TO TWENTY-EIGHT SOCIOECONOMIC VARIABLES IN THE STATES WITH BELOW AVERAGE FISCAL CAPACITY (STEPWISE REGRESSION)

Variables	Multiple R	R^2	R^2 Change	Simple R
VAR032	0.08701	0.7571	0.7571	0.0870
VAR011	0.8950	0.8010	0.0439	-0.0471
VAR013	0.9063	0.8214	0.0204	-0.2214
VAR008	0.9185	0.8436	0.0222	-0.3687
VAR012	0.9309	0.8666	0.0230	-0.1902
VAR010	0.9357	0.8755	0.0090	-0.0562
VAR028	0.9392	0.8822	0.0067	-0.0392
VAR007	0.9439	0.8909	0.0088	0.2100
VAR009	0.9491	0.9008	0.0099	0.5177
VAR031	0.9553	0.9126	0.0117	0.6129
VAR016	0.9570	0.9159	0.0033	0.1870

Principal Component Analysis of the Twenty-Eight Socioeconomic Variables and the Calculation of Factor Scores

Statistical Procedures

Because of the large number of independent variables and the fact that many were highly intercorrelated, principal component analysis was used to reduce the variables to a smaller number of uncorrelated factors that represented the underlying dimensions of the original data. These factors were then converted to factor scores for use in stepwise regression equations having state effort for education as the dependent variable.

Principal component analysis is a type of factor analysis that is used to transform a given set of variables into a set of composite factors or principal components that are orthogonal (uncorrelated) to each other.[15] This procedures required no assumption about the underlying structure of the variables.

There were three general steps in this type of factor analysis. The initial step involved the calculation of a product-moment correlation matrix. This established the appropriate measures of association that served as the basis for the factor procedure. With a principal component solution, the main diagonal of the correlation matrix was not altered. In other words, the unities (ones) in the diagonal were not replaced with estimates of communalities as was done in common factor analysis. The actual process of data-reduction began in the second step. In this step, a principal component solution was used to extract from the correlation matrix a new set of variables which were defined as exact mathematical transformations of the original data.[16] These new variables were the initial factors which were orthogonal (uncorrelated) to each other. The first principal component was the single best summary of linear relationships shown in the data. The second component was orthogonal to the first and was the second best linear combination of variables. To be independent of the first component, the second component had to account for the proportion of the variance not explained by the first one. The remaining components were similarly defined until all the remaining variance in the data was eliminated.[17] The final step in the factor analysis was the rotation of the initial factors into terminal factors. The factors were rotated around the origin until they were optimally aligned with distinct clusters of intercorrelated variables. This process minimized the number of factors and maximized the number with high loadings for each variable.

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[15] SPSS, p. 470.

The SPSS subprogram FACTOR[18] was used for this analysis. The factor method selected was PA 1 (principal factor without iteration) with an orthogonal rotation, VERIMAX. The subprogram was also capable of building factor scores for each case in the study. Factor scores are composite measures representing the theoretical dimensions associated with the respective factors.[19] Since principal component analysis was used, exact factor scores were calculated from the rotated factor matrix. These factor scores were then added to the original variables list as new variables for use in stepwise regression equations having state effort for education as the dependent variable. This latter procedure is discussed in the next section of this chapter.

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[16] Ibid.

[17] Ibid.

[18] Ibid., pp. 478-513.

[19] Ibid., p. 487.

Presentation of the Data

Through principal component analysis the twenty-eight socioeconomic variables were reduced to seven factors with eigenvalues greater than one explaining 82.8 percent of the variance in the data. Eigenvalues are equal to the sum of the column of squared loadings for each factor in the initial factor matrix. The subprogram FACTOR retained and printed only components with eigenvalues greater than or equal to 1.0. This process ensured that only factors accounting for at least the amount of the total variance of a single variable were treated as significant.

Table 13 contains the unrotated factor matrix for the twenty-eight socioeconomic variables. In the presentation of the results of a factor analysis, this matrix would be presented without elaboration. However, some of the important elements are described for informational purposes.

Seven initial factors were extracted by the principal component solution. These factors were orthogonal (uncorrelated) and represented statistically independent patterns of relationships common to the data. Because each factor was extracted in its order of importance, the amount of variation in the data described by each factor decreased successively with each new factor.[20]

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[20] R. J. Rummel, Applied Factor Analysis (Evanston, Illinois: Northwestern University Press, 1970), p. 142.

TABLE 13

TWENTY-EIGHT SOCIOECONOMIC VARIABLES
UNROTATED FACTOR MATRIX

	Unrotated Factors[a]							
Variables	1	2	3	4	5	6	7	h^2
005	-.8394	.1208	-.1275	-.0464	-.1298	.1655	.2260	.8330
006	-.4953	-.7458	.0020	-.0867	.2954	.0119	-.0814	.9031
007	.3239	.7813	-.0589	.1237	-.3313	-.0027	.0837	.8508
008	.8244	.3223	.0792	-.1522	-.0432	-.0466	.0462	.8191
009	-.0542	.4267	.5296	-.0909	.1397	-.3940	.3375	.7624
010	-.3759	-.2238	-.6314	-.3507	-.2589	-.1056	-.1964	.8298
011	-.3250	-.0046	-.7494	-.2152	.0109	-.2800	.0213	.7926
012	-.2072	-.5725	.2006	.2773	-.5328	-.1708	.2068	.8436
013	.4132	-.2005	.0773	-.4938	.0052	-.5396	-.1125	.7646
014	-.3853	.4306	.5982	-.1278	-.2856	.0437	-.1018	.8019
016	.1954	.3406	.2164	-.0386	-.1497	-.2706	-.7477	.8572
017	-.6252	.3939	-.0224	-.1883	.4542	-.0461	-.1462	.8118
018	.7934	.4258	-.3298	-.0228	-.0357	.0706	.0018	.9263
019	-.8149	.0556	.4700	.0738	.0333	.0366	-.1042	.9068
020	-.8632	-.0931	.3003	.0839	-.0276	.0354	-.0981	.8627
021	-.7045	-.2716	.2535	.1085	-.4187	-.0268	.0069	.8222
023	-.0796	-.2692	.0967	-.2015	-.0895	.5746	-.2952	.5541
025	.3037	.3471	.1227	.7145	.0653	-.2024	-.0063	.7836
026	-.4288	.5131	-.0135	.3114	.5412	.1308	-.0256	.8549
027	.9472	.1101	.0006	-.0565	.0013	-.0067	.0092	.9126
028	-.4566	.1757	-.6384	.4866	-.0220	-.1167	-.0587	.9013

TABLE 13 (continued)

Variables	Unrotated Factors[a] 1	2	3	4	5	6	7	h^2
030	.6401	-.1447	.3948	-.3800	.0722	.1885	.0883	.7794
031	-.8153	.2016	-.0649	-.0547	-.1313	-.2049	-.0438	.7738
032	-.7977	.5151	-.1536	-.0624	-.0533	.0068	.0186	.9324
034	.3749	.6503	-.2868	.0865	-.3199	.3137	-.0299	.8548
036	.0964	-.8166	-.2205	-.0444	.0239	.0330	.1851	.7626
040	-.4220	.6027	-.1405	-.4857	-.0564	.1673	.1202	.8426
GOVT	-.4867	.5698	.0499	-.4480	-.0270	-.0616	.2613	.8376
Percent Total Variance	32.1	18.6	10.6	7.6	5.4	4.6	3.9	82.8
Percent Common Variance	38.7	22.5	12.8	9.2	6.5	5.6	4.7	100.0

[a] Principal component solution. Unity was employed in the main diagonal of the correlation matrix as a communality estimate, and only factors with eigenvalues greater than or equal to unity were extracted.

The factor loadings were delineated by the intersection of the factor columns and the variable rows. The loadings were the correlation coefficients between the variables and factors. The value of a factor loading indicated the strength and the direction of the association between a particular variable and a factor. The square of the loading indicated the proportion of the variation a variable had in common with an unrotated factor.[21]

The communality of each variable is shown in the unrotated matrix under the column headed h^2. This was the proportion of a variable's total variance that was accounted for by the factors and was the sum of the squared loadings for a variable.[22] The sum of the column, h^2, represented the total variance accounted for by the seven factors, 82.8 percent. The percent of total variance figures showed the percent of total variance among the variables related to a particular factor. The percent of common variance figures indicated how the common variance was divided among the factors.[23]

The VARIMAX rotated factor matrix is shown in Table 14. The interpretation of this matrix is similar to that of the unrotated matrix. The seven rotated factors were orthogonal to each other and represented a better alignment of the factors with the distinct data clusters. These rotated factors accounted for 82.8 percent of the total variance in the data. The amount of total and common variance explained by the rotated factors did not change from the unrotated matrix.

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[21] Ibid., p. 137.

[22] Ibid., p. 142.

[23] Ibid., p. 144.

TABLE 14

TWENTY-EIGHT SOCIOECONOMIC VARIABLES ROTATED FACTOR MATRIX - VARIMAX ROTATION

Variable Number	Orthogonally Rotated Factors						
	1	2	3	4	5	6	7
005	(.6927)	.0278	.2973	.3701	.1348	-.0494	-.3262
006	.3283	(-.8464)	.1215	-.0351	-.0137	-.2206	-.1182
007	-.1840	(.8710)	-.0132	.0652	.0496	.2108	.0844
008	(-.7030)	.3897	-.3356	.0125	-.1026	.1439	.1703
009	.1539	.1211	-.4091	.2068	.1458	(.6982)	.0716
010	.0907	-.1967	(.7081)	.3782	-.2308	-.2734	.1022
011	-.0571	-.1431	(.8058)	.3363	.0190	.0632	-.0457
012	.4477	-.1838	.0102	-.3001	(-.6983)	.0629	-.1661
013	-.4474	-.3177	-.0887	.2196	-.3450	.2812	.4574
014	(.6070)	.3334	-.3962	.2759	.0587	.0860	.2799
016	-.0281	.2622	-.0611	-.1052	.0781	-.0265	(.8752)
017	.3637	-.1187	.1678	.3793	(.6816)	.1142	.1251
018	(-.7946)	(.5383)	.0206	-.0321	.0277	-.0024	.0533
019	(.8840)	-.1498	-.1514	.0954	.2524	.0332	.0774
020	(.8822)	-.2303	.0210	.0792	.1501	-.0444	.0128
021	(.8372)	-.1358	.0637	.0154	-.3067	-.0594	-.0317
023	.1151	-.1209	-.2053	.0879	-.0340	(-.6891)	.0185
025	-.0806	.4173	-.0513	(-.6476)	.1973	.3744	.0431
026	.2849	.1337	.0903	-.0569	(.8421)	.1392	-.1266
027	(-.8251)	.2647	-.3007	-.1649	-.1670	.0412	.1205
028	.2700	.1799	(.8116)	-.2230	.2460	.0440	-.1589

TABLE 14 (continued)

Variable Number	1	2	3	4	5	6	7
			Orthogonally Rotated Factors				
030	(-.5064)	-.0863	(-.6703)	.1180	-.1990	-.1028	.0465
031	(.6951)	-.0031	.3790	.3126	.1375	.1519	.0856
032	(.6269)	.2536	.3684	.4281	.3825	.0931	-.0317
034	-.3080	(.8435)	.0881	.0608	.0775	-.1752	-.0160
036	-.1869	(-.6002)	.1272	-.1508	-.4248	-.2058	-.3250
040	.2165	.3361	.1208	(.7601)	.2982	-.0085	-.0385
GOVT	.3288	.2370	.0242	(.7333)	.2406	.2750	-.0381
Percent Total Variance	25.8	14.5	11.9	9.9	9.6	5.8	5.3
Cumulative Total Variance			82.8				
Percent Common Variance	31.2	17.4	14.4	12.0	11.6	7.0	6.4
Cumulative Common Variance			100.0				

Note: Loadings greater than an absolute value of .50 are shown in parentheses.

Factor 1 accounted for 25.8 percent of the total variance in the data. Eleven variables had factor loadings of .50 or greater and were selected as the primary identification of the factor. These variables and their factor loadings, in order of their importance, are shown in Table 15.

TABLE 15

FACTOR 1

Variable Number	Variable Name	Factor Loading
019	Percent population age 25 and older with four or more years of high school	.8840
020	Median years of schooling completed by population age 25 and older	.8822
021	Public high school graduates in 1972 as a percent of ninth graders in 1968	.8372
027	Percent families with incomes less than poverty level	-.8251
018	Percent population age 25 and older with less than five years of schooling	-.7946
008	Percent school revenue from federal government	-.7030
031	Median family income	.6951
005	Personal income per capita	.6927
032	Percent families with incomes of $15,000 or more	.6269
014	Per capita expenditures for higher education	.6070
030	Percent population in rural areas	-.5064

Five variables had loadings of .50 or more on Factor 2. This factor accounted for 14.5 percent of the variance in the data. The variables accounting for Factor 2 are shown in Table 16.

TABLE 16

FACTOR 2

Variable Number	Variable Name	Factor Loading
007	Percent school revenue from state government	.8710
006	Percent school revenue from local government	-.8464
034	Percent population nonwhite	.8434
036	Percent population age 65 and older	-.6002
018	Percent population age 25 and older with less than five years of schooling	.5383

Factor 3 (Table 17) accounted for 11.9 percent of the total variance in the data. Four variables loaded into this factor at the level of .50 or more.

Three variables with factor loadings of .50 or more defined the underlying characteristic of Factor 4 (Table 18). This factor explained 9.9 percent of the variance in the data.

Factor 5 was also defined by three variables with factor loadings of .50 or more (Table 19); 9.9 percent of the variance in the data was accounted for by the factor.

TABLE 17

FACTOR 3

Variable Number	Variable Name	Factor Loading
028	Percent population in SMSA	.8116
011	Population per square mile	.8058
010	Nonpublic school enrollment as a percent of total enrollment	.7081
030	Percent population rural	-.6703

TABLE 18

FACTOR 4

Variable Number	Variable Name	Factor Loading
040	Per capita governmental debt	.7601
GOVT	Per capita expenditures for other government functions	.7333
025	Pupil-teacher ratio	-.6476

TABLE 19

FACTOR 5

Variable Number	Variable Name	Factor Loading
026	Percent population increase, 1960-70	.8421
012	Enrollment in grades 9-12 as a percent of total public school enrollment	-.6983
017	Public school enrollment change, 1962-72	.6816

Factor 6 was described by only two variables with loadings of .50 or more (Table 20). This factor accounted for 9.6 percent of the total variance in the data.

TABLE 20

FACTOR 6

Variable Number	Variable Name	Factor Loading
009	Percent civilian unemployment	.6982
023	Local basic administrative units per 10,000 pupils	-.6891

Only one variable loaded onto Factor 7 at the level of .50 or more (Table 21). This factor accounted for 5.8 percent of the total variance in the data and was indicative of educational need.

TABLE 21

FACTOR 7

Variable Number	Variable Name	Factor Loading
016	School age population (ages 5-17) as a percent of total population	.8752

The seven factors described by the socioeconomic variables accounted for 82.8 percent of the total variance in the data. Each factor was defined by different variables with the exception of VAR018 (percent population age 25 and older with less than five years of schooling) and VAR030 (percent population rural) which loaded on two different factors. Only those variables that correlated with the individual factors at the level of .50 or more were selected. The level of .50 was selected so that at least 25 percent ($.50^2$) of the variance of an individual variable was explained by an orthogonal factor.

The Use of Factor Scores in Stepwise Regression Equations Having State Effort for Education as the Dependent Variable

Statistical Procedures

One of the options of the SPSS subprogram FACTOR was the calculation of factor scores for each case.[24] Factor scores are statistical constructs that are used to represent the theoretical dimensions associated with each factor. Exact factor scores were calculated from the rotated factor matrix since a principal component analysis was used.

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[24] SPSS, p. 487

The subprogram FACTOR was directed to produce the factor scores on punched cards so they could conveniently be added to the original data file for subsequent statistical analysis. The factor scores were used as independent variables in stepwise regression equations having state effort for education as the dependent variable. Separate stepwise regressions using STEFIN 1 and STEFIN 2 as the dependent variable were computed for all fifty states combined, the states with above and below average effort, and the states grouped according to above and below average fiscal capacity. The SPSS subprogram REGRESSION was used in the analysis.[25]

Presentation of the Data

The first stepwise regression used STEFIN 1 as the dependent variable and was computed for all fifty states combined (Table 22). For all the regressions used in this section, the criteria selected to determine whether a variable should be entered in the equation was the same as used in Phase III ($F \geq .05$ and $T \geq .30$).

Five factors entered the first regression equation. These factors had a combined multiple R of .6153, thereby, accounting for 38 percent of the variance in STEFIN 1. Factor 7 explained almost 14 percent of the total variance and Factor 5 accounted for an additional 15 percent. Factor 3 was not brought into the equation since its F ratio was .002 which was less than the required .05 for entry.

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[25] Ibid., pp. 342-67.

Factor 4 was also excluded from the regression equation since its tolerance level (.24) was less than the criterion value of .30.

TABLE 22

RELATIONSHIP OF STATE EFFORT INDEX 1 TO
SEVEN FACTORS IN FIFTY STATES
(STEPWISE REGRESSION)

Factors	Multiple R	R^2	R^2 Change	Simple R
7	0.3722	0.1385	0.1385	0.3722
5	0.5395	0.2911	0.1526	0.2408
6	0.6094	0.3714	0.0803	0.1955
2	0.6108	0.3731	0.0017	-0.3253
1	0.6153	0.3786	0.0056	0.2507

The next stepwise regression was computed for STEFIN 2 for all fifty states combined (Table 23). Six factors entered this equation. The multiple R for these factors was .5655 and the R^2 was .3198. Three factors accounted for 28.2 percent of the variance in STEFIN 2. Factor 4 accounted for nearly 8 percent of the variance; Factor 5 explained 13 percent; and Factor 1 explained a little more than 7 percent of the total variance.

TABLE 23

RELATIONSHIP OF STATE EFFORT INDEX 2 TO SEVEN FACTORS IN FIFTY STATES (STEPWISE REGRESSION)

Factors	Multiple R	R^2	R^2 Change	Simple R
4	0.2781	0.0773	0.0773	0.2781
5	0.4575	0.2093	0.1320	0.1330
1	0.5310	0.2820	0.0727	0.1855
2	0.5461	0.2982	0.0162	-0.1252
6	0.5634	0.3175	0.0193	0.2710
3	0.5655	0.3198	0.0023	-0.0047

The next series of regression equations was computed for various categories of states. This computation included the states above and below average effort according to both effort indices and the states grouped according to above and below average fiscal capacity as measured by net personal income and the Balanced Tax System. (A caveat mentioned earlier is in order at this point: regression equations tend toward an upward bias. Because of the small number of cases in relation to the number of factors, the results of some of the following regression equations might appear excessively high. However, since statistical inferences were not made from the results, this potential weakness was not considered to be a major threat to the findings.)

Four factors explained 22 percent of the variance in effort among the twenty-four states with greater than average effort according to

STEFIN 1 (Table 24). The combined multiple R for these factors was .4667. Factor 2 accounted for 8 percent of the variance. Factor 4 also accounted for nearly 8 percent of the total variance.

TABLE 24

RELATIONSHIP OF STATE EFFORT INDEX 1 TO SEVEN
FACTORS IN THE STATES WITH ABOVE AVERAGE
EFFORT FOR EDUCATION
(STEPWISE REGRESSION)

Factors	Multiple R	R^2	R^2 Change	Simple R
5	0.2017	0.0407	0.0407	0.2017
4	0.3466	0.1201	0.0794	0.1966
2	0.4481	0.2008	0.0807	-0.1690
3	0.4667	0.2178	0.0170	-0.1958

In the twenty-six states with below average effort (STEFIN 1), six factors had a combined multiple R of .5676 and accounted for 32 percent of the variance in the effort index (Table 25). Factor 3 accounted for 12.6 percent of the variance and Factor 5 explained an additional 8 percent.

Five factors had a combined multiple R of .8411 and explained 71 percent of the variance in STEFIN 2 in the twenty-three states with above average effort (Table 26). Factor 6, alone, accounted for almost 32 percent of the total variance. Another 15 percent of the variance was explained by Factor 5.

TABLE 25

RELATIONSHIP OF STATE EFFORT INDEX 1 TO SEVEN FACTORS IN THE STATES WITH BELOW AVERAGE EFFORT FOR EDUCATION (STEPWISE REGRESSION)

Factors	Multiple R	R^2	R^2 Change	Simple R
5	0.2831	0.0802	0.0802	0.2831
6	0.3322	0.1104	0.0302	0.1900
3	0.4867	0.2368	0.1265	0.1182
7	0.4945	0.2446	0.0077	0.0136
2	0.5215	0.2720	0.0274	-0.1027
1	0.5676	0.3221	0.0502	0.2532

TABLE 26

RELATIONSHIP OF STATE EFFORT INDEX 2 TO SEVEN FACTORS IN THE STATES WITH ABOVE AVERAGE EFFORT FOR EDUCATION (STEPWISE REGRESSION)

Factors	Multiple R	R^2	R^2 Change	Simple R
6	0.5656	0.3199	0.3199	0.5656
5	0.6868	0.4716	0.1518	0.5482
4	0.7510	0.5640	0.0923	0.3140
7	0.7934	0.6295	0.0656	-0.3700
1	0.8411	0.7074	0.0780	0.1180

The percentage of variance explained fell considerably among the twenty-seven states with below average effort according to STEFIN 2. The five factors had a multiple R of .4941, thus explaining only 24 percent of the total variance in STEFIN 2 in this group of states (Table 27). Factor 5 explained 11.5 percent of the variance. The remaining four factors each explained from 2 to almost 5 percent of the remaining variance.

TABLE 27

RELATIONSHIP OF STATE EFFORT INDEX 2 TO SEVEN FACTORS IN THE STATES WITH BELOW AVERAGE EFFORT FOR EDUCATION (STEPWISE REGRESSION)

Factors	Multiple R	R^2	R^2 Change	Simple R
5	0.3394	0.1152	0.1152	-0.3394
1	0.3844	0.1478	0.0326	-0.0179
6	0.4191	0.1757	0.0279	0.1297
2	0.4724	0.2232	0.0475	0.0593
3	0.4941	0.2441	0.0209	0.0354

The final series of regressions was calculated for those states with above and below average fiscal capacity according to net personal income per ADM and the Balanced Tax System per ADM. Twenty-eight states had above average fiscal capacity when measured by net personal income per ADM. Six factors had a combined multiple R of .7700 and explained 59.3 percent of the variance in STEFIN 1 (Table 28). Factor

4 accounted for 19 percent of the variance and Factor 6 accounted for 16.4 percent.

TABLE 28

RELATIONSHIP OF STATE EFFORT INDEX 1 TO
SEVEN FACTORS IN THE STATES WITH ABOVE
AVERAGE FISCAL CAPACITY
(STEPWISE REGRESSION)

Factors	Multiple R	R^2	R^2 Change	Simple R
4	0.4355	0.1896	0.1896	0.4355
5	0.5291	0.2800	0.0903	0.0624
3	0.5915	0.3498	0.0700	0.1710
6	0.7170	0.5140	0.1642	0.3241
1	0.7577	0.5741	0.0601	0.0590
2	0.7700	0.5930	0.0188	-0.1019

In the twenty-two states with below average fiscal capacity according to net personal income per ADM, five factors entered the equation and explained 84 percent of the variance in STEFIN 1 (Table 29). Three factors made substantial contributions to the explanatory power of the equation. Factor 2, alone, accounted for 30 percent of the variance in STEFIN 1 and was negatively related to it. Factor 3 and Factor 7 explained 19 percent and 15 percent of the variance, respectively. Factor 6 accounted for less than 1 percent. Factor 2 was negatively related to STEFIN 1 in this equation.

TABLE 29

RELATIONSHIP OF STATE EFFORT INDEX 1 TO SEVEN FACTORS IN THE STATES WITH BELOW AVERAGE FISCAL CAPACITY (STEPWISE REGRESSION)

Factors	Multiple R	R^2	R^2 Change	Simple R
2	0.5498	0.3022	0.3022	-0.5498
3	0.7014	0.4920	0.1897	0.1401
5	0.7338	0.5385	0.0466	0.4714
7	0.8312	0.6909	0.1524	0.5257
6	0.8361	0.6991	0.0081	0.0416

Five factors had a combined multiple R of .7180 and explained 51.5 percent of the variance in STEFIN 2 among the twenty-three states with above average fiscal capacity according to the Balanced Tax System per ADM (Table 30). Factor 4 accounted for 31.8 percent of the total variance in STEFIN 2. Factor 1 explained an additional 7.7 percent of the variance and was negatively related to STEFIN 2. Factor 5 was negatively related to STEFIN 2 and accounted for 4.5 percent of the total variation. Factor 6 accounted for an additional 5 percent of the variation.

TABLE 30

RELATIONSHIP OF STATE EFFORT INDEX 2 TO SEVEN FACTORS IN THE STATES WITH ABOVE AVERAGE FISCAL CAPACITY (STEPWISE REGRESSION)

Factors	Multiple R	R^2	R^2 Change	Simple R
4	0.5643	0.3185	0.3185	0.5643
1	0.6291	0.3958	0.0774	-0.4456
5	0.6640	0.4409	0.0450	-0.2712
2	0.6801	0.4626	0.0217	0.0051
6	0.7180	0.5155	0.0530	0.0035

The final regression was calculated for the twenty-seven states with below average fiscal capacity according to the Balanced Tax System per ADM. Four factors had a combined multiple R of .8196 and explained 67 percent of the total variance in STEFIN 2 (Table 31). Factor 5, alone, accounted for over 40 percent of the variance. Factor 7 explained 18.5 percent of the variance. An additional 7 percent of the variance was explained by Factor 6.

In the ten regression equations using the factor scores as the independent variables, Factor 5 was brought into the regression first on four different occasions. It entered second in four separate regression equations. Factor 4 was brought into the regression first on three separate occasions. However, it was only brought in second on one occasion. In three regression equations, Factors 4 and 5 were entered together in either the first or second position.

TABLE 31

RELATIONSHIP OF STATE EFFORT INDEX 2 TO SEVEN FACTORS IN THE STATES WITH BELOW AVERAGE FISCAL CAPACITY (STEPWISE REGRESSION)

Factors	Multiple R	R^2	R^2 Change	Simple R
5	0.6357	0.4042	0.4042	0.6357
7	0.7676	0.5892	0.1850	0.1033
6	0.8112	0.6581	0.0689	0.5001
1	0.8196	0.6718	0.0137	0.5216

CHAPTER IV

FINDINGS AND ANALYSIS

The focus of this study was to determine the relationship between selected socioeconomic variables and state effort to support public education among the fifty states. The research was conducted in five phases as described in Chapter III.

The purpose of this chapter is to summarize and analyze the findings of each phase of the research. First, the two state effort indices are discussed and compared. Then, the simple correlations of the independent variables with the dependent variables, STEFIN 1 and STEFIN 2, are considered. The results of the stepwise regression equations using the socioeconomic variables are analyzed next. The final analyses cover the results of the principal component analysis and the use of the resultant factor scores in stepwise regressions having state effort for education as the dependent variable.

State Effort for Education - STEFIN 1 and STEFIN 2

The review of the literature and research indicated that alternative measures of state effort for education have been used in school finance studies. The general approach to calculating state effort has been to relate educational expenditures to some measure of fiscal capacity. Therefore, the first task in developing an effort index was the selection of an appropriate fiscal capacity measure.

Two methods have been used to determine fiscal capacity. One method used economic indicators, usually income or wealth, and the other method relied on a composite tax base measure. Both methods provided an indicator of the total economic resources available to a government for tax purposes. A representative example of each method of measuring fiscal capacity was selected for this study. Net personal income per ADM was the basis of STEFIN 1 and the Balanced Tax System per ADM was the basis of STEFIN 2. (See Chapter III, Phase I.)

The next step in the development of an effort index was to select an appropriate measure of educational expenditures. The decision was made to use state and local (current) educational expenditures from own sources per ADM. This figure was calculated by subtracting federal revenue receipts from total state and local current expenditures. Since the focus of the research was on state effort for education, the elimination of federal aid helped to insure that the remaining educational funds were from state and local sources. The computation of the two effort indices is shown in Appendices 1 and 2.

A comparison of STEFIN 1 and STEFIN 2 was prepared and is shown in Appendix 3. It should be noted, however, that since the expenditure figures were estimates, the relative rankings are subject to change pending final expenditure data for 1972-73. Each state's effort was converted to an index number based on the United States average of 100. States with an effort index above 100 made above average effort for a particular measure and those with an index less than 100 made a below average effort to support public schools.

Twenty-four states made greater than average effort according to STEFIN 1 and the remaining twenty-six made below average effort. According to STEFIN 2, twenty-three states were above average and twenty-seven were below average.

There was considerable change in the rankings of the states from STEFIN 1 to STEFIN 2. Only three states maintained the same rank for both indices. Twenty-seven states increased their respective ranks from Index 1 to Index 2, while twenty states declined in rank. Of the forty-seven states that changed rank, thirteen gained or lost ten or more positions. Colorado and Wyoming had the largest net change. Colorado declined twenty-eight positions going from twenty-first in STEFIN 1 to fiftieth in STEFIN 2. Wyoming went from twelfth to thirty-sixth. North Dakota advanced from forty-ninth on STEFIN 1 to thirty-first on STEFIN 2, a net gain of eighteen positions. Delaware, Iowa, and Virginia each advanced fifteen positions from Index 1 to Index 2.

Since different aspects of a state's economic structure were being measured, such changes could have been anticipated. The majority of the changes can probably be attributed to those states that declined in rank from Index 1 to Index 2. These states tended to have a large Balanced Tax System in comparison to their net personal income. Many of these states (i.e., Florida, Louisiana, and Colorado) relied heavily on consumer-type taxes instead of a broad-based tax structure. Therefore, when the results of the Balanced Tax System were calculated, these states had a greater potential fiscal capacity. An income-based measure would tend to understate the fiscal capacity in these states and overstate the relative effort for education. The relative large decline in rankings among these states contributed to the advances which a large number made from one index to the other.

An important caveat should be made at this point. In constructing effort indices for comparative purposes, careful consideration must be given to the various data to be used. For example, one should consider whether the data are estimates, revised estimates, or "final" figures. Governmental agencies often report financial data as estimates in order to provide current information. However, as additional information is received by these agencies, the estimates are often revised. Several years may elapse before the actual or final amounts are available, and final amounts may differ from the first estimates. Even the final amounts may not be the "actual" amount because of reporting and collecting problems that may be encountered. These data, though, have generally been recognized as the best available at the time.

Other considerations relate to the data to be used in the numerator and denominator portions of an effort ratio. As illustrated previously, by varying the fiscal capacity measure (the denominator), different results may be obtained in the relative rankings of the states. Different fiscal capacity measures emphasize different aspects of a state's economic structure.

The numerator of an effort ratio is also subject to possible alternative measures. Although the convention has been to use current expenditures, educational revenue receipts could also be used. The results, however, would be subject to question. The point of contention would be the difference in definition of the terms. Revenue receipts include all funds available for expenditures for current expenses, capital outlay, and debt service for public schools. Current expenditures include only the funds spent for the current operation of public schools and exclude the costs of capital outlay and debt service which tend to vary from year to year. Another consideration is whether or not the expenditures are from own sources. When state or local tax effort is being calculated, the use of expenditures from own sources eliminates the differential affect of federal aid.

An additional methodological consideration is the selection of a common unit by which to reduce the elements of an effort ratio for comparative purposes. Among the several possibilities are per capita, per ADA, per ADM, or per child of school age (ages 5-17). Each unit measures a different aspect of educational need within a jurisdiction. A total population unit may not be an adequate indicator of educational need. ADA figures include only those pupils attending when public schools are in session. ADM figures count the pupils belonging at a school, including those present and the ones absent. Both these enrollment figures, however, exclude those children attending private schools, as well as those who attend no school at all. The number of school age children (ages 5-17) is often used as a measure of educational need because it is a more inclusive figure that takes into account the fact that all children need an education. Because the degree of educational need varies among the states, the use of a particular unit measure could influence the calculation of the effort index.

The issues raised by this caveat are not intended to demean the importance of tax effort indices as tools of comparison, but the intent has been to elucidate issues that often are obscured by the ostensible simplicity of tax effort formulae.

The Simple Correlations Between the Socioeconomic Variables and State Effort for Education

The independent variables having significant correlations with state effort for education are shown in Table 32 and Table 33. The percent change in public school enrollments, 1962-72 (VAR017) had the highest simple correlation with both STEFIN 1 and STEFIN 2. States that had a substantial increase in public school enrollments during the ten-year period from 1962-72 tended to exert high effort for education regardless of the index used. This suggests that, as enrollments increased, states spent a larger portion of their fiscal capacity.

States characterized by high per capita expenditures for other governmental functions (GOVT) also tended to make high effort according to both indices. States with a large per capita governmental debt outstanding (VAR040) tended to make high effort for education. States characterized by high levels of education and income among the population (VAR019, VAR020, VAR005, VAR031, and VAR032) also tended to make high levels of effort. High per capita expenditures for higher education (VAR014) were positively correlated with state effort for public (elementary and secondary) education. States with many families with incomes below poverty level (VAR027) tended to make low effort. A large proportion of the population age 65 and older (VAR036) was also indicative of low-effort states.

Some variables were significantly related to state effort in Index 1 but not in Index 2. States with a large amount of school revenue from the federal government (VAR027) tended to make low effort according to STEFIN 1. States that had a low level of education among their residents (VAR018) and a large number of nonwhites

TABLE 32

INDEPENDENT VARIABLES SIGNIFICANTLY CORRELATED WITH STATE EFFORT INDEX 1 (IN DESCENDING ORDER OF CORRELATION)

Variable Number	Variable Name	R
017	Percent change in public school enrollment, 1962-72	.5353*
GOVT	Per capita expenditures for other governmental functions	.3705*
027	Percent families with incomes less than poverty level	-.3501*
020	Median years of schooling completed by the population age 25 and older	.3410*
008	Percent school revenue from federal government	-.3376*
019	Percent population age 25 and older with four or more years of high school	.3170**
031	Median family income	.3158**
032	Percent families with incomes of $15,000 or more	.3073**
014	Per capita expenditures for higher education	.3044**
025	Pupil-teacher ratio	-.2934**
016	School age population (ages 5-17) as a percent of total population	.2887**
040	Total governmental debt outstanding per capita	.2625**
018	Percent population age 25 and older with less than five years of school	-.2439**
036	Percent population age 65 and older	-.2406**

TABLE 32 (continued)

Variable Number	Variable Name	R
034	Percent population nonwhite	-.2377**
023	Local basic administrative units per 10,000 pupils	-.2337**

*Significant at .01 level.

**Significant at .05 level.

TABLE 33

INDEPENDENT VARIABLES SIGNIFICANTLY CORRELATED WITH STATE EFFORT INDEX 2 (IN DESCENDING ORDER OF CORRELATION)

Variable Number	Variable Name	R
017	Percent change in public school enrollment, 1962-72	.4427*
GOVT	Per capita expenditures for other governmental functions	.4398*
032	Percent families with incomes of $15,000 or more	.4305*
036	Percent population age 65 and older	-.3749
040	Total governmental debt outstanding per capita	.3645*
031	Median family income	.3531*
014	Per capita expenditures for higher education	.3393*
027	Percent families with incomes less than poverty level	-.2885**
005	Personal income per capita	.2818**
009	Percent labor force unemployed	.2659**
020	Median years of schooling completed by the population age 25 and older	.2358**

*Significant at .01 level.

**Significant at .05 level.

(VAR034) also tended to make low effort. A large number of school districts per 10,000 pupils (VAR023) and a large pupil-teacher ratio (VAR025) were indicative of states that made low effort. In those states with a large proportion of school age children (VAR016), state effort tended to be high.

High unemployment (VAR009) was positively correlated with STEFIN 2. Those states with high levels of unemployment tended to make high effort for education.

Individual Variables in Regression Equations With State Effort - All States

State Effort Index 1

For the purposes of the following analyses, generally those variables that contributed at least 1 percent to the cumulative R^2 were selected for discussion. Variables that contributed less than 1 percent to the explanation were deemed to be nonsignificant for further analysis. In the regression equation using STEFIN 1 as the dependent variable, ten variables accounted for 73 percent of the total variance in effort among all states (Table 34).

Percent change in public school enrollment, 1962-72, explained 29 percent of the variance in STEFIN 1. School age population and pupil-teacher ratio each accounted for just over 8 percent of the total variance. An additional 6 percent of the variance was explained by the number of school districts per 10,000 pupils. These four variables together accounted for 51 percent of the variance in STEFIN 1 among all states. Therefore, in states that had experienced large percent increases in both public school enrollment and in the number

TABLE 34

THE RELATIONSHIP OF STATE EFFORT INDEX 1
TO SIGNIFICANT INDEPENDENT VARIABLES
FOR ALL STATES

Variable Number	Variable Name	R^2	R^2 Change	Simple R
017	Percent change in public school enrollment, 1962-72	.2946	.2946	.5428
016	School age population (ages 5-17) as a percent of total population	.3781	.0835	.2885
025	Pupil-teacher ratio	.4586	.0805	-.2938
023	Local basic administrative units per 10,000 pupils	.5189	.0604	-.2370
034	Percent population nonwhite	.5599	.0409	-.2338
005	Personal income per capita	.5826	.0228	.0418
008	Percent school revenue from federal government	.6340	.0514	-.3341
GOVT	Per capita expenditures for other governmental functions	.6892	.0552	.3683
036	Percent population age 65 and older	.7153	.0260	-.2426
007	Percent school revenue from state government	.7292	.0140	-.0089

of school age children, had a low pupil-teacher ratio, and maintained few school districts per 10,000 pupils, the state effort for education tended to be high.

Variables 034, 005, 008, GOVT, 036, and 007 accounted for an additional 22 percent of the variance in STEFIN 1. Low effort states tended to have a high concentration of nonwhites and the aged. These states also received a larger proportion of school revenues from the federal government. Nevertheless, in the low effort states, a larger share of school revenues came from the state government.

Since per capita personal income was positively related to STEFIN 1, high effort states tended to be more wealthy than low effort states. Per capita expenditures for other governmental functions were positively related to STEFIN 1. High effort states for education also tended to expend greater amounts of money for other governmental functions including highways, health and hospitals, welfare, police and fire protection, and sewage and sanitation. A normal assumption is that higher expenditures for these functions would tend to draw tax dollars away from public education; however, the converse appears to have been the case.

State Effort Index 2

On STEFIN 2 ten variables accounted for 61 percent of the variation among all states (Table 35). Three variables made rather substantial contributions to the explanation of the total variance. Percent change in public school enrollment, 1962-72, accounted for almost 20 percent of the variance. Fifteen percent of the variance was explained by percent increase in the population, 1960-70. Percent

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TABLE 35

THE RELATIONSHIP OF STATE EFFORT INDEX 2 TO SIGNIFICANT INDEPENDENT VARIABLES FOR ALL STATES

Variable Number	Variable Name	R^2	R^2 Change	Simple R
017	Percent change in public school enrollment, 1962-72	.1985	.1985	.4455
026	Percent population increase, 1960-70	.3476	.1491	.0236
036	Percent population 65 and older	.4734	.1258	-.3760
GOVT	Per capita expenditures for other governmental functions	.4958	.0224	.4385
023	Local basic administrative units per 10,000 pupils	.5157	.0199	-.2042
007	Percent school revenue from state government	.5274	.0117	.2431
034	Percent population nonwhite	.5557	.0283	-.0676
005	Personal income per capita	.5750	.0193	.2815
016	School age population (ages 5-17) as a percent of total population	.5896	.0147	.2265
030	Percent population in rural areas	.6082	.0186	.0126

population age 65 and older accounted for 12.6 percent of the variance in STEFIN 2 and was negatively related to it. Together these three variables explained a little more than 47 percent of the total variance.

Seven variables together accounted for about 13.5 percent of the variance among all the states. Percent of the population nonwhite was negatively related to STEFIN 2 and explained almost 3 percent of the variance. Per capita expenditures for other governmental functions accounted for just over 2 percent of the variance and was positively related to STEFIN 2.

Variables 023, 007, 005, 016, and 030 each explained less than 2 percent of the total variance. The number of school districts per 10,000 pupils was negatively related to state effort and explained about 2 percent of the variance.

In general, states with an increase in public school enrollments, an increase in the general population, and a higher percent of school age children tended to make high effort. States that had high per capita expenditures for other governmental services also tended to make a higher effort for public schools. High effort states tended to have higher levels of personal income per capita. These findings are all consistent with those reported for STEFIN 1. In fact, STEFIN 1 and STEFIN 2 had eight of the first ten variables in common.

Low effort was characterized by having a higher percentage of the population age 65 and older, a higher proportion of nonwhites, and a larger number of school districts.

In terms of sources of revenue, high effort states tended to receive a larger proportion of school funds from the state government.

This was contrary to the finding in STEFIN 1 where the proportion of school revenue from the state government was inversely related to effort. Another interesting finding was that states with a high percentage of the population in rural areas (VAR030) tended to make high effort on STEFIN 2; however, only a weak positive relation (r = .0126) existed between VAR030 and STEFIN 2 in the regression equation.

Individual Variables in Regression Equations With State Effort - States With Above Average Effort

State Effort Index 1

Ten variables accounted for 80 percent of the variance in state effort for education among the twenty-four states with above average effort (Table 36). It was not surprising to have found such a large percentage of the variance explained since only twenty-four states were used in the regression equation.

Percent population in rural areas, alone, accounted for 37 percent of the variance in STEFIN 1 and was positively related to it. High school graduates in 1972 as a percent of ninth graders in 1968 explained an additional 14 percent of the variance, but was negatively related to STEFIN 1. These two variables accounted for 51 percent of the total variance. Eight variables accounted for the remaining 29 percent of the variance.

States with above average effort for education tended to be predominately rural with a poor high school retention rate. These states also had a high proportion of poor families, whether measured by the number with incomes below poverty level or the per capita personal

TABLE 36

THE RELATIONSHIP OF STATE EFFORT INDEX 1 TO SIGNIFICANT INDEPENDENT VARIABLES IN THE STATES WITH ABOVE AVERAGE EFFORT

Variable Number	Variable Name	R^2	R^2 Change	Simple R
030	Percent population in rural areas	.3743	.3743	.6118
021	Public high school graduates in 1972 as a percent of ninth graders in 1968	.5105	.1362	-.4148
027	Percent families with incomes less than poverty level	.5803	.0698	.0748
023	Local basic administrative units per 10,000 pupils	.6203	.0400	.4710
017	Percent change in public school enrollment, 1962-72	.6560	.0356	.3472
008	Percent school revenue from federal government	.7260	.0700	.0420
007	Percent school revenue from state government	.7458	.0198	.0442
005	Personal income per capita	.7773	.0315	-.2728
013	General revenue sharing funds per capita	.7856	.0084	.1563
010	Nonpublic school enrollment as a percent of total school enrollment	.8030	.0174	-.0669

income. In these states the number of school districts per 10,000 pupils was positively related to effort. This was probably due to the lack of school district consolidation in many rural states. Increasing public school enrollments also characterized the above average effort states.

Since these states had a high incidence of poverty and since some federal aid programs are targeted to low-income children, these states tended to derive a large proportion of school revenue from the federal government. These states also tended to receive larger amounts of general revenue sharing funds from the federal government. Revenue sharing funds are distributed on the basis of total population, tax effort, and relative income;[1] therefore, the states with above average effort for education would qualify on the basis of the relative income.

In the above average effort states, a low proportion of children attended private schools. Since these states were characterized as low income, the parents had apparently opted for the "free" public school system for the education of their children.

The states with above average effort tended to have a limited fiscal capacity from which to support public schools. In all likelihood, an above average effort was required to provide the basic school services.

State Effort Index 2

Nine variables accounted for 94 percent of the variance in STEFIN 2 (Table 37). Percent labor force unemployed, alone, explained 46 percent of the total variance; however, this particular variable did not

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[1] Edward R. Fried, Alice M. Rivlin, Charles L. Schultze, and Nancy H. Teeten, Setting National Priorities - The 1974 Budget (Washington, D.C.: The Brookings Institution, 1973), pp. 279-80.

TABLE 37

THE RELATIONSHIP OF STATE EFFORT INDEX 2 TO SIGNIFICANT INDEPENDENT VARIABLES IN THE STATES WITH ABOVE AVERAGE EFFORT

Variable Number	Variable Name	R^2	R^2 Change	Simple R
009	Percent labor force unemployed	.4591	.4591	.6775
017	Percent change in public school enrollment, 1962-72	.5899	.1308	.5729
008	Percent school revenue from federal government	.6543	.0644	.1331
018	Percent population age 25 and older with less than five years of schooling	.7349	.0806	.0647
028	Percent population in SMSA	.7956	.0607	-.3909
013	General revenue sharing funds per capita	.8452	.0496	-.0981
006	Percent school revenue from local government	.8942	.0490	-.4058
023	Local basic administrative units per 10,000 pupils	.9245	.0303	-.0770
021	Public high school graduates in 1972 as a percent of ninth graders in 1968	.9388	.0143	-.0006

enter the regression equation for the states with above average effort according to STEFIN 1. An additional 13 percent of the variance was accounted for by percent change in public school enrollment, 1962-72. Percent school revenues from the federal government was positively related to STEFIN 2 and the proportion of school revenues from the local level was negatively related to effort. These variables accounted for 6.4 percent and 5 percent of the variance respectively. Percent of the population in Standard Metropolitan Statistical Areas (SMSA) explained 6 percent of the variance and was inversely related to state effort. This appeared to be a proxy measure of degree of rural population. These five variables accounted for 76.4 percent of the total variance in STEFIN 2.

High rates of unemployment and increasing school enrollments tended to be associated with states making above average effort for education. High unemployment may tend to be associated with declining state and local tax collections as workers who have lost their jobs begin to restrict their consumption of consumer goods and services. Unemployment is usually associated with a decline in business activity which also has a negative impact on tax collections. Since STEFIN 2 was a tax-based measure, any decline in tax collections would be reflected in a lower level of fiscal capacity. In the short run, school expenditures would probably not be decreased so the relative effort would remain high.

In comparing the findings of STEFIN 1 and STEFIN 2 among the states with above average effort, both indices had five explanatory variables in common. Among the above average effort states according to both indices, state effort was explained by percent school revenue from federal government, percent change in public school enrollment (1962-72), general revenue sharing funds per capita, number of school districts per 10,000 pupils, and high school graduates in 1972 as a percent of ninth graders in 1968. The same or similar variables tended to be associated with effort among the states with above average effort when measured by alternative effort indices.

Individual Variables in Regression Equations With State Effort - States With Below Average Effort

State Effort Index 1

Ten variables accounted for 84 percent of the variance in STEFIN 1 among the states with below average effort (Table 38). Three variables made substantial contributions to the explanation of the variance. The number of school districts per 10,000 pupils accounted for 24 percent of the variance and was inversely related to effort. Eighteen percent of the variance was accounted for by percent families with incomes less than poverty level and it was also negatively related to effort. School age population as a percent of total population explained nearly 20 percent of the variance but was positively related to STEFIN 1.

States with many school districts in relation to the number of pupils, many families with poverty level incomes, and a small proportion of school age children tended to make below average effort. These states were also characterized as being rural. Per capita expenditures for other governmental functions was positively related to state effort in below average effort states, suggesting that the below average effort states were providing little support for governmental services.

TABLE 38

THE RELATIONSHIP OF STATE EFFORT INDEX 1 TO SIGNIFICANT INDEPENDENT VARIABLES IN THE STATES WITH BELOW AVERAGE EFFORT

Variable Number	Variable Name	R^2	R^2 Change	Simple R
023	Local basic administrative units per 10,000 pupils	.2394	.2394	-.4893
027	Percent families with incomes less than poverty level	.4171	.1777	-.3552
016	School age population (ages 5-17) as a percent of total population	.6127	.1956	.3426
030	Percent population in rural areas	.6786	.0659	-.0948
012	Enrollment in Grades 9-12 as a percent of total public school enrollment	.7292	.0505	-.2255
013	General revenue sharing funds per capita	.7780	.0488	-.1713
025	Pupil-teacher ratio	.8014	.0235	.3477
026	Percent increase in population, 1960-70	.8197	.0182	.2231
040	Total governmental debt per capita	.8275	.0078	-.1533
GOVT	Per capita expenditures for other government functions	.8388	.0112	.3089

State Effort Index 2

Seventy-seven percent of the variance in STEFIN 2 was explained by ten socioeconomic variables among the states with below average effort (Table 39). Percent increase in population, 1960-70, was inversely associated with effort and accounted for 13 percent of the total variance. An additional 11 percent of the variance was explained by per capita expenditures for higher education which was also negatively related to effort. The number of school districts per 10,000 pupils accounted for 10 percent of the variance and was inversely related to STEFIN 2. The first five variables that entered the regression equation were negatively associated with STEFIN 2. States with a large growth rate for both total population and school enrollment, many poor families, and low per capita expenditures for higher education tended to make below average effort according to STEFIN 2.

Variables 026, 023, 027, 030, 013, and 025 entered the regression equation for both STEFIN 1 and STEFIN 2 among the states with below average effort. State effort for education among states with below average effort on both indices tended to be explained by percent increase in the population (1960-70), number of school districts per 10,000 pupils (negative relation), percent families with incomes less than poverty level (negative relation), percent population in rural areas, revenue sharing funds per capita, and pupil-teacher ratio. The same or similar variables tended to combine to influence state effort in below average states regardless of the index used.

TABLE 39

THE RELATIONSHIP OF STATE EFFORT INDEX 2 TO SIGNIFICANT INDEPENDENT VARIABLES IN THE STATES WITH BELOW AVERAGE EFFORT

Variable Number	Variable Name	R^2	R^2 Change	Simple R
026	Percent increase in population, 1960-70	.1335	.1335	-.3653
023	Local basic administrative units per 10,000 pupils	.2351	.1016	-.2726
027	Percent families with incomes less than poverty level	.3226	.0876	-.0788
017	Percent change in public school enrollment, 1962-72	.3646	.0420	-.2809
014	Per capita expenditures for higher education	.4771	.1125	-.0359
034	Percent population nonwhite	.5663	.0892	.0510
009	Percent labor force unemployed	.6269	.0606	.1015
030	Percent population in rural areas	.7134	.0865	.2404
013	General revenue sharing per capita	.7497	.0364	.0974
025	Pupil-teacher ratio	.7704	.0207	-.2115

Individual Variables in Regression Equations With State Effort - States With Above Average Fiscal Capacity

State Effort Index 1

Net personal income per ADM was the selected measure of fiscal capacity used in STEFIN 1. Thirteen variables combined to explain about 91 percent of the total variance in STEFIN 1 (Table 40). Median family income, alone, explained 36 percent of the variance and personal income per capita accounted for an additional 10 percent. General revenue sharing funds per capita also explained 10 percent of the variance. These three variables accounted for over half of the total variance in STEFIN 1.

Income was the most significant variable in explaining state effort among above average income states. In the above average income states, income was positively related to STEFIN 1. The influence of general revenue sharing funds per capita can probably be explained by the fact that above average income states tended to be more urbanized with larger populations and greater tax effort for other governmental functions.

State Effort Index 2

The fiscal capacity measure in STEFIN 2 was the Balanced Tax System per ADM. In the regression equation of the above average fiscal capacity states showing the relationship between STEFIN 2 and the independent variables, eleven variables accounted for 86 percent of the total variance (Table 41). Percent population age 25 and older with four or more years of high school accounted for 31 percent of the variance and was inversely related to STEFIN 2. An additional 17

TABLE 40

THE RELATIONSHIP OF STATE EFFORT INDEX 1 TO SIGNIFICANT INDEPENDENT VARIABLES IN THE STATES WITH ABOVE AVERAGE FISCAL CAPACITY

Variable Number	Variable Name	R^2	R^2 Change	Simple R
031	Median family income	.3646	.3646	.6038
013	General revenue sharing funds per capita	.4668	.1021	.2614
005	Personal Income per capita	.5648	.0981	.1054
023	Local basic administrative units per 10,000 pupils	.6149	.0501	-.4489
016	School age population as a percent of total population	.6680	.0531	.5289
GOVT	Per capita expenditures for other governmental functions	.7324	.0645	.5428
010	Nonpublic school enrollment as a percent of total school enrollments	.7758	.0434	.2549
030	Percent population in rural areas	.8124	.0366	-.0756
034	Percent population nonwhite	.8312	.0188	-.0323
020	Median years of schooling completed by population age 25 and older	.8540	.0227	.0019
008	Percent school revenue from federal government	.8850	.0310	-.2107
021	Public high school graduates in 1972 as a percent of ninth graders in 1968	.8948	.0098	.0807
026	Percent increase in the population, 1960-70	.9062	.0114	.0494

TABLE 41

THE RELATIONSHIP OF STATE EFFORT INDEX 2
TO SIGNIFICANT INDEPENDENT VARIABLES
IN THE STATES WITH ABOVE
AVERAGE FISCAL CAPACITY

Variable Number	Variable Name	R^2	R^2 Change	Simple R
019	Percent population age 25 and older with four or more years of high school	.3128	.3128	-.5593
016	School age population (ages 5-17) as a percent of total population	.4794	.1666	.2380
009	Percent labor force unemployed	.5688	.0894	-.0969
018	Percent population age 25 and older with less than five years of schooling	.6530	.0842	.2504
021	High school graduates in 1972 as a percent of ninth graders in 1968	.7507	.0977	-.2004
006	Percent school revenue from local government	.7895	.0388	-.1538
030	Percent population in rural areas	.8117	.0222	.0840
040	Total governmental debt per capita	.8318	.0201	.2339
036	Percent population age 65 and over	.8440	.0123	-.0664
012	Enrollment in grades 9-12 as a percent of total public school enrollment	.8512	.0071	-.1437
GOVT	Per capita expenditures for other governmental functions	.8649	.0137	.1558

percent of the variance was explained by school age population (ages 5-17) as a percent of total population. These two variables explained over half of the total variance in STEFIN 2 among the states with above average fiscal capacity. Percent population age 25 and older with less than five years of schooling explained 8 percent of the variance and was positively associated with state effort.

The level of education of the adult population and the number of school age children were the most significant variables in explaining state effort in wealthy states. Also, the school retention rate was inversely related to effort.

Total governmental debt per capita and per capita expenditures for other governmental functions were positively related to STEFIN 2 in states with greater revenue potential. These states tended to use larger proportions of their tax resources to support a great variety of government services.

In comparing STEFIN 1 and STEFIN 2 among the states with above average fiscal capacity, only four variables entered both regression equations. They were GOVT, 016, 021, and 030. The effort indices had fewer explanatory variables in common among the states with above average fiscal capacity than they did when the states were grouped according to levels of effort.

Individual Variables in Regression Equations With State Effort - States With Below Average Fiscal Capacity

State Effort Index 1

Eight variables combined to explain 95 percent of the total variance in STEFIN 1 among the states with below average fiscal capacity as measured by net personal income per ADM (Table 42). Percent change in public school enrollment, 1962-72, alone, accounted for over 60 percent of the total variance. An additional 16 percent of the variance was explained by percent population in SMSA which was inversely related to state effort. Six of the eight variables had inverse relations with STEFIN 1.

Large increases in public school enrollments and percent of population in urban areas (SMSA) were the most significant variables in explaining effort in poorer states. In poor states large increases in school enrollments tended to be associated with higher effort for education. Also in the poor states the less the degree of urbanization the greater the effort for education.

State Effort Index 2

Five variables together explained 87 percent of the total variance in STEFIN 2 among the states with below average fiscal capacity (Table 43). Fiscal capacity was measured by the Balanced Tax System per ADM. Percent families with incomes of $15,000 or more, alone, accounted for 76 percent of the variance. Only 11 percent of the variance was explained by the remaining four variables.

Family income was the most important variable in explaining effort in poor states. Density was inversely related to state effort in states with below average fiscal capacity. Greater proportion of revenue from the federal government, whether school aid or general revenue sharing funds, tended to be associated with low effort.

In comparing STEFIN 1 and STEFIN 2 among the states with below average fiscal capacity, both indices had only three variables in

TABLE 42

THE RELATIONSHIP OF STATE EFFORT INDEX 1 TO SIGNIFICANT INDEPENDENT VARIABLES IN THE STATES WITH BELOW AVERAGE FISCAL CAPACITY

Variable Number	Variable Name	R^2	R^2 Change	Simple R
017	Percent change in public school enrollment, 1962-72	.6010	.6010	.7753
028	Percent population in SMSA	.7579	.1569	-.0887
013	General revenue sharing funds per capita	.7960	.0381	-.0166
025	Pupil-teacher ratio	.8215	.0255	-.5064
036	Percent population age 65 and older	.8637	.0421	-.1452
008	Percent school revenue from federal government	.8872	.0235	-.5615
012	Enrollment in grades 9-12 as a percent of total public school enrollment	.9330	.0458	-.2914
020	Median years of schooling completed by the population age 25 and older	.9509	.0179	.5473

TABLE 43

THE RELATIONSHIP OF STATE EFFORT INDEX 2 TO SIGNIFICANT INDEPENDENT VARIABLES IN THE STATES WITH BELOW AVERAGE FISCAL CAPACITY

Variable Number	Variable Name	R^2	R^2 Change	Simple R
032	Percent families with incomes of $15,000 or more	.7571	.7571	.8701
011	Population per square mile	.8010	.0439	-.0471
013	General revenue sharing funds per capita	.8214	.0204	-.2214
008	Percent school revenues from federal government	.8436	.0222	-.3687
012	Enrollment in grades 9-12 as a percent of total enrollment	.8666	.0230	-.1902

common. Two of these variables were related to revenue sources from the federal government. They were the percent of school revenue from the federal government and the total general revenue sharing funds per capita. Enrollment in grades 9-12 as a percent of total enrollment was also common to both indices.

Summary of Regression Equation Findings Using Individual Variables

For all states combined, according to both STEFIN 1 and STEFIN 2, percent change in public school enrollment was the most significant explanatory variable. In the states with above average effort according to STEFIN 1, percent population in rural areas was the most significant variable. In the states with above average effort according to STEFIN 2, the most significant variable was percent labor force unemployed. Local basic administrative units per 10,000 was the most significant (and negatively correlated) variable for the states with below average effort according to STEFIN 1. For the states with below average effort according to STEFIN 2, the most significant (and negatively correlated) variable was percent increase in the population.

For the states with above average fiscal capacity when measured by net personal income per ADM, the most explanatory variable was median family income. Percent population age 25 and older with four or more years of high school was the most significant (and negatively correlated) variable among the states with above average fiscal capacity measured by the Balanced Tax System per ADM. In the states with fiscal capacity below average when measured by the net personal income per ADM, percent change in public school enrollment was the most significant variable. For the states with below average fiscal capacity according to the Balanced Tax System per ADM, percent families with incomes of $15,000 or more was the most significant variable.

It appears that, in states which experienced an increase in public school enrollment during the decade from 1962-72, there tended to be higher effort for education. Based on the various regressions with the different categories of states, demographic and public education variables appeared to be more important in explaining state effort for education than did income variables.

Principal Component Analysis of the Socioeconomic Variables

Since many of the independent variables were highly intercorrelated, the possibility existed that in the regression equations some of the variables might tend to mask the influence of others. Therefore, principal component analysis was used to reduce the socioeconomic variables to a smaller set of orthogonal (uncorrelated) factors that represented the underlying dimensions of the original data. The factors were then converted to factor scores to be used as "new" independent variables in stepwise regression equations having state effort for education as the dependent variable.

The rotated factor matrix produced by the principal component analysis (see Table 14) provided the basis for the identification of the factors. Factors were not explicitly identified by the statistical process. Factor loadings represent correlation coefficients between the variables and the factors; the absolute value of the loading indicates the strength of the association and the sign gives the direction. The square of the factor loading indicates the proportion of

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the variance of a variable that is explained by the factor. By analyzing the rotated factor matrix in terms of the factor loadings, insight may be gained into the underlying nature of each factor. The factor can then be identified by its basic characteristics.

A summary table (Table 44) has been prepared to display the factor loadings of the twenty-eight socioeconomic variables on the orthogonal factors. Only those loadings of .50 or more were selected for further analysis. The level of .50 was chosen so that at least 25 percent ($.50^2$) of the variance of an individual variable was explained by a factor.

In Factor 1, percent population age 25 and older and median years of schooling completed by population age 25 and older each had a positive loading of .88 on the factor. Public high school graduates in 1972 as a percent of ninth graders in 1968 had a positive loading of .84. Percent population age 25 and older with less than five years of schooling had a high, negative loading on the factor. Factor 1 related strongly to education levels.

Factor 1 was also strongly related to four levels of income: median family income, personal income per capita, percent families with incomes of $15,000 or more, and percent families with incomes less than poverty level (negative relation). Therefore, Factor 1 was also identified by levels of income. Per capita expenditures for higher education had a correlation of .61 with Factor 1. Since Factor 1 related to measures of educational attainment and levels of income, it was labeled "Education/Income."

Percent school revenue from state government was strongly loaded on Factor 2. Percent school revenue from local government had a

TABLE 44

HIGHEST LOADINGS OF TWENTY-EIGHT SOCIOECONOMIC VARIABLES ON ORTHOGONAL FACTORS

Variable Number	Variable Name	Orthogonally Rotated Factors 1	2	3	4	5	6	7
019	Percent population age 25 and older with four or more years of high school	.88						
020	Median years of schooling completed by population age 25 and older	.88						
021	Public high school graduates in 1972 as a percent of ninth graders in 1968	.84						
027	Percent families with incomes less than poverty level	-.82						
018	Percent population age 25 and older with less than five years of schooling	-.79						
008	Percent school revenue from federal government	-.70						
013	Median family income	.70						
005	Personal income per capita	.69						
032	Percent families with incomes of $15,000 or more	.62						
014	Per capita expenditures for higher education	.61						
030	Percent population in rural areas	-.51						
007	Percent school revenue from state government		.87					
006	Percent school revenue from local government		-.85					
018	Percent population age 25 and older with less than five years of schooling		.84					
036	Percent population age 65 and older		-.60					
034	Percent population nonwhite		.54					
028	Percent population in SMSA			.81				
011	Population per square mile			.81				
010	Nonpublic school enrollment as a percent of total enrollment			.71				
030	Percent population rural			-.67				
040	Per capita governmental debt				.76			
GOVT	Per capita expenditures for other government functions				.73			
025	Pupil-teacher ratio				-.65			
026	Percent population increase, 1960-70					.84		
012	Enrollment in grades 9-12 as a percent of total enrollment					-.70		
017	Public school enrollment change, 1962-72					.68		
009	Percent civilian unemployment						.70	
023	Local basic administrative units per 10,000 pupils						-.69	
016	School age population (ages 5-17) as a percent of total population							.88

strong, negative correlation with the factor. Percent population age 25 and older with less than five years of schooling also loaded heavily on Factor 2. There was an inverse relation between Factor 2 and percent population age 65 and older. Percent population nonwhite had a positive loading on the factor. Factor 2 was characterized by high state support, low education, nonaged, and nonwhite. It was labeled "High state support/Low education."

In Factor 3, percent population per square mile and percent population in SMSA each loaded on the factor at the .81 level. Nonpublic school enrollment as a percent of total enrollment had a correlation of .71 with the factor. Percent population rural had a negative loading on the factor. Because all four variables were urban characteristic, Factor 3 was labeled "Urbanization."

Per capita governmental debt had a strong correlation with Factor 4. Per capita expenditures for other government functions was also highly correlated with the factor. Pupil-teacher ratio had a negative loading on Factor 4. This factor was characterized by high demands for governmental services and the willingness to spend for the services. This factor was named "Government."

In Factor 5, percent population increase, 1960-70, had a high correlation with the factor. Enrollment in grades 9-12 as a percent of total enrollment had a strong, negative loading. Public school enrollment change, 1962-72, was positively correlated with the factor. This factor would appear to identify the states that had experienced growth by both the general population and school population during the past decade. This factor was labeled "Young/Growth."

Percent civilian unemployment was highly correlated with Factor 6. Local basic administrative units per 10,000 pupils had a strong, negative loading on the factor. The factor was designated "Unemployment/Consolidation."

In Factor 7, school age population (ages 5-17) as a percent of total population had a strong, positive association with the factor. It was the only variable that correlated with Factor 7 at the .50 level or higher. This factor was labeled "Educational need."

Seven factors were derived from the principal component analysis. Each factor was identified by the variables that were highly correlated with it. The factors were named to identify their underlying characteristic. Since the factors were orthogonal or uncorrelated, they should measure independent dimensions of the original variables.

Factor Scores in Regression Equations With State Effort - All States

The final phase of the research consisted of using the calculated factor scores in a series of stepwise regression equations having state effort for education as the dependent variable. A factor score is a composite index representing the weighted average of the variables that make up a factor. This process allows the factors to be quantified for use in subsequent statistical analysis. The scores were then added to the original variables list as if they were new variables.

The regressions were computed using both state effort indices as the dependent variables. This was done first with all fifty states combined, then with the states grouped into above and below average effort according to each index. The final regressions were computed for the states categorized by above and below average fiscal capacity according to net personal income and the Balanced Tax System.

State Effort Index 1

Five factors combined to explain 38 percent of the variance in STEFIN 1 among all fifty states combined. Factor 7 (Educational Need) and Factor 5 (Young/Growth) together accounted for 29 percent of the variance.

The findings indicated that for all states combined, states with a high degree of educational need and a young, growing population tended to exert higher effort for education. This would seem to indicate that states making high effort had accepted the responsibility for providing for the educational needs of their children. This would also indicate that young families in growing areas tend to have high aspiration levels for the schools since they probably have children attending the schools.

Factor 5 contributed more to the explanation of variance in STEFIN 1 than Factor 7, but Factor 7 was brought into the equation first. This can be explained by the fact that Factor 7 had a higher simple correlation with STEFIN 1, and the stepwise regression technique selected it for entry before Factor 5.

State Effort Index 2

Six factors combined to explain about 32 percent of the variance in STEFIN 2 among all states combined. Factor 4 (Government) was positively related to effort and explained almost 8 percent of the total variance. Factor 5 (Young/Growth) accounted for 13 percent of the variance in STEFIN 2. Factor 1 (Education/Income) explained an additional 7 percent of the variance. These three factors together explained 28 percent of the total variance.

States that provided many governmental services for their residents, had a young and growing population, and had high levels of education and income also tended to make high effort for education according to STEFIN 2. Factor 5 again appeared to be the most important factor, even though it was entered second. Young families with children in schools probably have higher levels of expectations for the state and local governments. In states with high levels of income and education, there also tended to be high effort. This might be an indication of the willingness and ability to spend more for the public schools.

Factor Scores in Regression Equations With State Effort - States With Above Average Effort

State Effort Index 1

In the states with above average effort, four factors combined to explain 22 percent of the total variance in STEFIN 1. In this regression, Factor 5 (Young/Growth) entered the equation first because it had the highest simple correlation with state effort, but it explained only 4 percent of the variance. Factor 4 (Government) and Factor 2 (High state support/Low education) each accounted for 8 percent of the variance. Factor 2 was inversely related to STEFIN 1.

These findings suggest that among the above average effort states, those states having a young and growing population, high emphasis on governmental services, and a lower degree of state school support and low education levels tended to exert high effort for public schools. The influence of Factor 5 and Factor 4 has been discussed previously. Since Factor 2 was inversely related to effort in the above average effort states, those states that tended to provide a lower proportion of school revenues from the state and had a higher level of education made higher levels of effort for education.

State Effort Index 2

Five factors combined to explain 71 percent of the total variance in STEFIN 2 among the states with above average effort. Factor 6 (Unemployment/Consolidation), alone, accounted for 32 percent of the total variance. Factor 5 (Young/Growth) explained an additional 15 percent of the variance.

Factor 7 (Educational need) explained about 7 percent of the variances and was inversely related to STEFIN 2. Thus, in states with above average effort, low educational need was associated with high effort. Since Factor 5 (Young/Growth) was also important in these states, proportionately fewer school aged children may have existed among this group of young families.

Factor Scores in Regression Equations With State Effort - States With Below Average Effort

State Effort Index 1

Among the states with below average effort, six factors explained 32 percent of the variance in STEFIN 1. Factor 5 (Young/Growth) accounted for 8 percent of the variance and Factor 6 (Unemployment/Consolidation) explained an additional 3 percent. Factor 3

(Urbanization) accounted for 13 percent of the variance in STEFIN 1.

Therefore, among the states with below average effort, those states with few young people and a low growth rate, low levels of unemployment, and a low degree of urbanization tended to make low effort. These states probably had an older and more stable population living in a rural (nonurban) area.

State Effort Index 2

Five factors combined to explain 24 percent of the variance in STEFIN 2 among the states with below average effort. Factor 5 (Young/Growth) accounted for nearly half of the total variance. However, this factor was inversely related to state effort. Factor 1 (Education/Income) was also negatively related to STEFIN 2 and explained 3 percent of the variance.

Among the states with below average effort according to STEFIN 2, those states with a high proportion of young families and a high growth rate tended to make low effort. This finding was contrary to what was found in the previous regressions using the factor scores. Since an inverse relation existed between Factor 5 and STEFIN 2, some states having an older, more stable population placed a high value on public schools. If this was the case, the same rationale could be extended to an explanation of Factor 1. Since Factor 1 was inversely related to STEFIN 2 among the below average effort states, low levels of both education and income may tend to characterize states that have an older, more stable population.

Another possible explanation would be that the effort index may account for the apparent paradox. Since STEFIN 2 was a tax-based measure of effort, even modest levels of educational expenditures in relation to a limited tax system would tend to produce higher effort. States with an older and more stable population may also tend to have lower levels of incomes; thus, they may have only a limited tax base to be tapped for the support of public schools.

Factor Scores in Regression Equations With State Effort - States With Above Average Fiscal Capacity

State Effort Index 1

Among the states with above average fiscal capacity as measured by net personal income per ADM, five factors accounted for 59 percent of the total variance in STEFIN 1. Factor 4 (Government) explained 19 percent of the variance and Factor 6 (Unemployment/Consolidation) explained an additional 16 percent. Together these two factors accounted for 35 percent of the total variance.

Among the wealthier states, those that supported other governmental functions and had high levels of unemployment tended to make high effort. Since Factor 3 (Urbanization) was also included in the regression equation, it also tended to explain effort in the wealthier states. High effort states were also characterized by Factor 5 (Young/Growth) and Factor 1 (Education/Income) if they were also above average in fiscal capacity.

State Effort Index 2

Among the states with above average fiscal capacity when measured by the Balanced Tax System per ADM, five factors combined to explain 52 percent of the variance in STEFIN 2. Factor 4 (Government) accounted for 32 percent of the variance in the effort index. Factor 1

(Education/Income) accounted for 7 percent of the variance and was inversely related to STEFIN 2. Factor 5 (Young/Growth) was also negatively related to the index.

In the wealthier states according to the Balanced Tax System, states that had a high support for governmental functions tended to also make higher effort for education. However, the states that made high effort among the wealthier states tended not to have a young, growing population. These states tended also to have low levels of both education and income, but still made high effort for education.

Factor Scores in Regression Equations With State Effort - States With Below Average Fiscal Capacity

State Effort Index 1

Among the states with below average fiscal capacity when measured by net personal income per ADM, five factors accounted for 70 percent of the variance in STEFIN 1. Factor 2 (High state support/Low education), alone, accounted for 30 percent of the variance and was inversely related to STEFIN 1. Factor 3 (Urbanization) and Factor 7 (Educational need) explained 19 percent and 15 percent of the variance respectively. These three factors accounted for 64 percent of the total variance.

States that provided a higher proportion of revenue for public schools from state sources and had low levels of education tended to make low effort among the poorer states. However, among the poorer states, those states that were highly urbanized and had a high degree of educational need tended to make higher effort for education.

State Effort Index 2

Four factors accounted for 67 percent of the total variance in STEFIN 2 among the states with below average fiscal capacity. Factor 5 (Young/Growth), alone, accounted for 40 percent of the total variance. Factor 1 (Education/Income), Factor 6 (Unemployment/Consolidation), and Factor 7 (Educational need) accounted for the remainder of the variance.

Thus, among the states with below average fiscal capacity when measured by the Balanced Tax System per ADM, a young, growing population and a large educational need tended to result in greater effort for education. For the states that made low effort, the converse of these factors was present. Even if states had a limited tax base, it appears that young families were willing to support education.

Summary of Regression Equation Findings Using Factors

For all states combined, Factor 7 (Educational need) was the most important factor in explaining the variance in STEFIN 1. Factor 4 (Government) was the most significant factor in explaining the variance among all states according to STEFIN 2. In both regressions, Factor 5 (Young/Growth) accounted for the largest single amount of the variance in the effort indices. But, since its simple correlation with the effort indices was less than other factors, it was not brought into the equation first.

In the states with above average effort according to STEFIN 1, Factor 5 (Young/Growth) entered the equation first, but did not explain the most variance in effort. Factor 4 (Government) and Factor

2 (High state support/Low education) both explained more variance than did Factor 5. Factor 6 (Unemployment/Consolidation) was the most significant explanatory factor of STEFIN 2 among the states with above average effort.

For the states with below average effort according to STEFIN 1, Factor 5 (Young/Growth) was the most significant factor. Factor 5 was also the most important explanatory factor of the variance in STEFIN 2 in the states with below average effort.

Factor 4 (Government) was the most significant factor in explaining the variance in STEFIN 1 among the states with above average fiscal capacity when measured by net personal income. The same factor, Factor 4, was also the most significant factor in the states with above average fiscal capacity as measured by the Balanced Tax System.

In the states with below average fiscal capacity according to net personal income, Factor 2 (High state support/Low education) was the most important explanatory factor of STEFIN 1. Factor 5 (Young/Growth) was the most significant factor in the states with below average fiscal capacity as measured by the Balanced Tax System.

Two factors appeared to be the most significant explanatory factors among all combinations of states. Factor 5 (Young/Growth) was brought into the regressions first on four different occasions. It was also entered second in four separate regression equations. Factor 4 (Government) was brought into the regressions first on three separate occasions. In three regressions, Factor 4 and Factor 5 were entered together in either first or second position.

CHAPTER V

SUMMARY, MAJOR FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The degree to which variations in fiscal capacity and tax effort are allowed to influence the provision of public education is one of the major problems facing policymakers today. Before the policymakers can formulate equitable solutions to these complex problems, they must have a body of research on which to base their ultimate decisions. Educators must, therefore, continue their efforts by providing original research and leadership in the resolution of school finance problems.

One of the goals of school finance research is to explain fiscal theory and economic behavior as they relate to the financial support of public education. The concept of state and local effort has long been a part of the literature and research in school finance. It is no longer enough to simply show that variations exist among states in their relative effort for education. What is needed today are explanations of why such variations exist, and what, if anything, can be done about them.

The Problem of the Study

The focus of this problem was to determine the relationship between selected socioeconomic variables and state effort in the support of public schools in the fifty states of the United States. The specific aspects of the problem were as follows:

1. To develop two measures of state effort to support education: one, an income-based measure, State Effort Index 1; and the other, a tax-based measure, State Effort Index 2.
2. Using State Effort Index 1 and State Effort Index 2, to determine which variable or variables accounted for the variance in effort among all the states combined, among the states grouped according to above or below average effort, and among the states grouped according to above or below average fiscal capacity.
3. To examine the findings of sub-problems one and two and to compare the results of the two effort indices in terms of the findings and the variables associated with each.

The socioeconomic variables were derived from the literature and research and included variables related to income, public education, demographic characteristics, and other governmental functions.

Procedures

The research for this study was conducted in five phases. Phase I involved the collection of data related to the two specified measures of state effort for education and the calculation of STEFIN 1 and STEFIN 2. The identification and collection of data related to the socioeconomic variables was the focus of Phase II. Phase III consisted of a series of stepwise regression equations having state effort for education as the dependent variables. The socioeconomic variables were designated as independent. Regression equations were calculated for all states combined, for the states grouped according to above or below average effort, and for the states grouped according to above or below average fiscal capacity. For each category of states, the regression equations were calculated for STEFIN 1 and STEFIN 2. In Phase IV a principal component analysis was used to reduce the twenty-eight socioeconomic variables to a smaller set of uncorrelated factors that reflected the independent dimensions of subsets of the original data, and factor scores were calculated. In Phase V, the factor scores were used in stepwise regression equations having STEFIN 1 and STEFIN 2 as the dependent variables. The regressions were calculated for the same combination of states as was done in Phase III.

Major Findings

In analyzing the data, a series of stepwise regression equations using the two effort indices were calculated for all the states combined, the states grouped according to above or below average effort, and the states grouped according to above or below average fiscal capacity. This was done for the twenty-eight socioeconomic variables and for the seven derived factors.

In the various categories of states, the following variables or factors were positively associated with state effort according to both STEFIN 1 and STEFIN 2. The number of times that each variable or factor appeared in the various regressions is shown in parentheses.

GOVT	Per capita expenditures for other governmental functions	(5)
VAR005	Personal income per capita	(3)
VAR007	Percent school revenue from state government	(2)
VAR008	Percent school revenue from federal government	(2)
VAR009	Percent labor force unemployed	(2)
VAR010	Nonpublic school enrollment as a percent of total public school enrollment	(1)

VAR013	General revenue sharing funds per capita	(3)
VAR016	School age population (ages 5-17) as a percent of total population	(5)
VAR017	Percent change in public school enrollment, 1962-72	(5)
VAR018	Percent population age 25 and older with less than five years of schooling	(2)
VAR020	Median years of schooling completed by the population age 25 and older	(2)
VAR021	Public high school graduates in 1972 as a percent of ninth graders in 1968	(1)
VAR023	Local basic administrative units per 10,000 pupils	(1)
VAR025	Pupil-teacher ratio	(1)
VAR026	Percent increase in the population, 1960-70	(3)
VAR027	Percent families with incomes less than poverty level	(1)
VAR030	Percent population in rural areas	(4)
VAR031	Median family income	(1)
VAR032	Percent families with incomes of $15,000 or more	(1)
VAR034	Percent population nonwhite	(1)
VAR040	Total governmental debt per capita	(1)
FAC001	Education/Income	(6)
FAC002	High state support/Low education	(1)
FAC003	Urbanization	(4)
FAC004	Government	(5)
FAC005	Young/Growth	(7)
FAC006	Unemployment/Consolidation	(9)
FAC007	Educational need	(3)

Twenty-one of the twenty-eight socioeconomic variables were positively associated with state effort for education among the various categories of states according to STEFIN 1 and STEFIN 2. All seven factors were positively related to state effort in one or more instances. Seven of the variables or factors were positively related to state effort in at least five of the regression equations. They were GOVT, VAR016, VAR017, FAC001, FAC004, FAC005, and FAC006. In other words, these seven variables were important explanatory variables in at least half of the regression equations for the various categories of states. Several variables and/or factors were positively related to state effort each time they were permitted to enter the regressions. These were GOVT, VAR016, VAR018, VAR020, VAR031, VAR032, FAC004, and FAC006. GOVT (per capita expenditures for other governmental functions) and FAC004 (Government) were both positively related to state effort for education each time they entered the equation.

In the various categories of states, the following variables or factors were negatively associated with both STEFIN 1 and STEFIN 2. The number of times that each variable or factor appeared in the various regressions is shown in parentheses.

VAR005	Personal income per capita	(1)
VAR006	Percent school revenue from local government	(2)
VAR007	Percent school revenue from state government	(1)
VAR008	Percent school revenue from federal government	(4)
VAR009	Percent labor force unemployed	(1)

VAR010	Nonpublic school enrollment as a percent of total school enrollment	(1)
VAR011	Population per square mile	(1)
VAR012	Enrollment in grades 9-12 as a percent of total public school enrollment	(4)
VAR013	General revenue sharing funds per capita	(4)
VAR014	Per capita expenditures for higher education	(1)
VAR017	Percent change in public school enrollment, 1962-72	(1)
VAR019	Percent population age 25 and older with four or more years of high school	(1)
VAR021	Public high school graduates in 1972 as a percent of ninth graders in 1968	(3)
VAR023	Local basic administrative units per 10,000 pupils	(6)
VAR025	Pupil-teacher ratio	(3)
VAR026	Percent increase in population, 1960-70	(1)
VAR027	Percent families with incomes less than poverty level	(2)
VAR028	Percent population in SMSA	(2)
VAR030	Percent population in rural areas	(2)
VAR034	Percent population nonwhite	(3)
VAR036	Percent population age 65 and older	(4)
VAR040	Total governmental debt per capita	(1)
FAC001	Education/Income	(2)
FAC002	High state support/Low education	(6)
FAC003	Urbanization	(2)

FAC005	Young/Growth	(2)
FAC007	Educational need	(1)

Twenty-two of the socioeconomic variables entered the various regression equations for the different categories of states and were negatively associated with state effort according to STEFIN 1 and STEFIN 2 in one or more equations. Five factors were negatively associated with effort in one or more instances. Only one variable and one factor entered in a negative direction in at least five of the regressions. They were VAR023 and FAC002. Seven variables were negatively related to state effort in all the regressions they entered. These were VAR006, VAR011, VAR012, VAR014, VAR019, VAR028, and VAR036.

Conclusions

A positive relationship appeared to exist between state effort for education and per capita expenditures for other governmental functions. In other words, those states that spent proportionately more per capita for other governmental functions (i.e., highways, welfare, police and fire protection, and health) made a higher effort for public education. This strong positive relation suggests that both variables could be explained by the people's expectations of government for a variety of public services.

High effort states were also characterized by increases in school age population and subsequent increases in school enrollments. This is best explained by the underlying influence of Factor 5 (Young/ Growth). High concentrations of young families in growing states were more willing to support public education, especially if they had young children in the schools. Young families with children in the schools would probably have higher levels of educational aspirations for the state school system.

States with large numbers of school districts generally made low effort for education. Variations in wealth and poverty may be found among districts, and the number of times that the number of districts per 10,000 pupils entered the equations suggests a substantial amount of inequality of educational opportunity in the low effort states.

The findings of this research suggest that the socioeconomic variables which tend to influence state effort for education can be classified as either controllable or noncontrollable. In other words, state legislators can control some variables and cannot control others. Population and school enrollment growth are examples of significant explanatory variables over which the states have little control. The states, on the other hand, can control the number of school districts and the proportion of state school revenue.

Levels of state effort for education are determined by the degree to which states can control or not control certain socioeconomic variables. However, certain variables may, in fact, be proxies for a broader class of idiosyncratic variables reflecting the people's beliefs, values, and attitudes. For example, the beliefs of the people about the role of government or the levels of educational aspirations of the citizenry probably interact with certain socioeconomic variables to influence the levels of state effort for education.

States are capable of supporting higher levels of effort for education. This is supported by the additional revenue potentials under the Balanced Tax System. Many states are underutilizing the available fiscal capacity as represented by a broader tax base. The decision to tap the additional revenue potential is a political decision. If the concept of equality of educational opportunity is to be realized among the states, state legislators must take the leadership in supporting a tax system that can realize the revenue potential for the support of education.

Recommendations

The review of the literature, findings, and conclusions of this study suggest the following areas for further research:

1. Basic research should be undertaken to identify state political power structure variables.
2. Studies should be undertaken to identify and quantify idiosyncratic variables.
3. Following the conclusion of the research activities outlined in the two previous recommendations, further research efforts should focus on the manner in which these variables interact with socioeconomic variables as predictors of state effort for education.

APPENDIX 1

PART A

COMPUTATION OF NET PERSONEL INCOME-1973

NOTE: See Appendix 1, Part C, for sources of data.

State (1)	Personal Income 1973 (In Millions) (2)	Total Population 1972 (In Thousands) (3)	Subsistence Allowance Total Population x $750 (In Thousands) (4)	Federal Personal Income Tax Paid (In Thousands) (5)	Net Personal Income Col. 2 minus Cols. 4 & 5 (In Thousands) (6)
Alabama	$ 13,700	3,521	$ 2,640,750	$ 1,029,362	$10,029,888
Alaska	1,958	325	243,750	173,575	1,540,675
Arizona	9,655	1,963	1,472,250	833,367	7,349,383
Arkansas	8,050	2,008	1,506,000	512,027	6,031,973
California	113,746	20,411	15,308,250	9,610,526	88,827,224
Colorado	12,225	2,634	1,975,500	1,087,547	9,191,953
Connecticut	18,265	3,080	2,310,000	1,947,908	14,007,092
Delaware	3,328	571	428,250	324,765	2,574,985
Florida	37,799	7,347	5,510,250	3,588,185	28,700,565
Georgia	21,032	4,733	3,549,750	1,781,815	15,700,435
Hawaii	4,582	816	612,000	415,503	3,554,497
Idaho	3,398	755	566,250	220,790	2,610,960
Illinois	64,833	11,244	8,433,000	6,311,819	50,088,181
Indiana	26,510	5,286	3,964,500	2,361,030	20,184,470
Iowa	15,314	2,884	2,163,000	1,091,873	12,059,127
Kansas	12,088	2,268	1,701,000	898,184	9,488,816
Kentucky	13,478	3,306	2,479,500	1,096,370	9,902,130
Louisiana	14,795	3,738	2,803,500	1,161,013	10,830,487
Maine	4,196	1,026	769,500	299,272	3,127,228
Maryland	22,339	4,048	3,036,000	2,293,531	17,009,469

APPENDIX 1, PART A (continued)

State (1)	Personal Income 1973 (In Millions) (2)	Total Population 1972 (In Thousands) (3)	Subsistence Allowance Total Population x $750 (In Thousands) (4)	Federal Personal Income Tax Paid (In Thousands) (5)	Net Personal Income Col. 2 minus Cols. 4 & 5 (In Thousands) (6)
Massachusetts	$ 30,561	5,796	$ 4,347,000	$ 2,868,471	$23,345,529
Michigan	50,201	9,013	6,759,750	4,603,859	38,837,391
Minnesota	20,019	3,877	2,907,750	1,501,588	15,609,662
Mississippi	8,112	2,256	1,692,000	531,422	5,888,578
Missouri	23,031	4,747	3,560,250	2,009,763	17,460,987
Montana	3,376	716	537,000	226,834	2,612,166
Nebraska	8,127	1,528	1,146,000	595,537	6,385,463
Nevada	3,148	533	399,750	303,560	2,444,690
New Hampshire	3,713	774	580,500	344,675	2,787,825
New Jersey	43,026	7,349	5,511,750	4,375,377	33,138,873
New Mexico	4,262	1,076	807,000	319,857	3,135,143
New York	104,198	18,367	13,775,250	9,673,831	80,748,919
North Carolina	22,577	5,221	3,915,750	1,815,040	16,846,210
North Dakota	3,645	634	475,500	164,977	3,004,523
Ohio	54,474	10,722	8,041,500	4,995,520	41,436,980
Oklahoma	11,558	2,633	1,974,750	906,627	8,676,623
Oregon	10,753	2,185	1,638,750	947,795	8,166,455
Pennsylvania	59,427	11,905	8,928,750	5,313,376	45,184,874
Rhode Island	4,710	969	726,750	403,743	3,579,507
South Carolina	10,582	2,688	2,016,000	827,140	7,738,860

APPENDIX 1, PART A (continued)

State (1)	Personal Income 1973 (In Millions) (2)	Total Population 1972 (In Thousands) (3)	Subsistence Allowance Total Population x $750 (In Thousands) (4)	Federal Personal Income Tax Paid (In Thousands) (5)	Net Personal Income Col. 2 minus Cols. 4 & 5 (In Thousands) (6)
South Dakota	$ 3,229	680	$ 510,000	$ 161,192	$ 2,557,808
Tennessee	16,897	4,072	3,054,000	1,418,313	12,424,687
Texas	53,912	11,604	8,703,000	4,716,720	40,492,280
Utah	4,711	1,127	845,250	354,580	3,511,170
Vermont	1,881	460	345,000	163,473	1,372,527
Virginia	23,506	4,765	3,573,750	2,205,110	17,727,140
Washington	17,674	3,418	2,563,500	1,517,283	13,593,217
West Virginia	7,107	1,795	1,346,250	602,115	5,158,635
Wisconsin	21,703	4,526	3,394,500	1,817,061	16,491,439
Wyoming	1,657	346	259,500	131,743	1,265,757
United States	1,057,825	208,230	156,172,500	93,570,296	808,082,204

APPENDIX 1

PART B

COMPUTATION OF STATE EFFORT INDEX I

NOTE: See Appendix 1, Part C, for sources of data.

State	Net Personal Income 1973 (In Thousands)	Total ADM	Net Personal Income Per ADM	State and Local Educational Expenditures From Own Sources (In Thousands)	State and Local Educational Expenditures Per ADM	State Effort	State Effort as % of U.S. Average	Rank
Alabama	$10,029,888	733,296	$13,678	$ 347,282	$ 474	.0347	71	48
Alaska	1,540,675	80,500	19,139	95,030	1,180	.0617	126	3
Arizona	7,349,383	428,042	17,170	479,758	1,121	.0653	133	2
Arkansas	6,031,973	413,418	14,590	222,549	538	.0369	75	47
California	88,827,224	4,407,000	20,156	3,952,025	897	.0445	91	31
Colorado	9,191,953	537,221	17,110	466,531	868	.0507	103	21
Connecticut	14,007,092	620,694	22,567	748,241	1,205	.0534	109	14
Delaware	2,574,985	123,860	20,789	129,949	1,049	.0505	103	23
Florida	28,700,565	1,398,989	20,515	1,094,575	782	.0381	78	45
Georgia	15,700,435	1,006,510	15,599	683,060	697	.0435	89	36
Hawaii	3,554,497	169,500	20,970	153,532	906	.0432	88	38
Idaho	2,610,960	176,500	14,793	117,596	666	.0450	92	29
Illinois	50,088,181	2,112,000	23,716	2,223,975	1,053	.0444	91	33
Indiana	20,184,470	1,101,916	18,318	905,129	821	.0448	91	30
Iowa	12,059,127	619,000	19,482	618,413	999	.0513	105	20
Kansas	9,488,816	452,581	20,966	369,327	816	.0389	79	43
Kentucky	9,902,130	665,000	14,890	370,449	557	.0374	76	46
Louisiana	10,830,487	799,986	13,538	607,904	760	.0561	114	9
Maine	3,127,228	232,000	13,479	174,555	752	.0558	114	10
Maryland	17,009,469	834,639	20,379	898,944	1,077	.0528	108	15

APPENDIX 1, PART B (continued)

State	Net Personal Income 1973 (In Thousands)	Total ADM	Net Personal Income Per ADM	State and Local Educational Expenditures From Own Sources (In Thousands)	State and Local Educational Expenditures Per ADM	State Effort	State Effort as % of U.S. Average	Rank
Massachusetts	$23,345,529	1,110,000	$21,032	$1,168,500	$1,053	.0501	102	24
Michigan	38,837,391	2,017,319	19,252	2,247,000	1,114	.0579	118	7
Minnesota	15,609,662	878,475	17,769	934,915	1,064	.0599	122	4
Mississippi	5,888,578	491,800	11,974	231,155	470	.0393	80	42
Missouri	17,460,987	916,400	19,054	724,585	791	.0415	85	40
Montana	2,612,166	176,800	14,775	136,817	774	.0524	107	16
Nebraska	6,385,463	314,208	20,322	202,490	644	.0317	65	50
Nevada	2,444,690	121,000	20,204	108,500	897	.0444	91	33
New Hampshire	2,787,825	155,300	17,951	130,710	842	.0469	96	27
New Jersey	33,138,873	1,390,964	23,824	1,707,000	1,227	.0515	105	19
New Mexico	3,135,143	267,089	11,738	171,970	644	.0549	112	11
New York	80,748,919	3,159,900	25,554	4,681,400	1,481	.0580	118	6
North Carolina	16,846,210	1,070,595	15,735	693,080	647	.0411	84	41
North Dakota	3,004,523	136,518	22,008	102,160	748	.0340	69	49
Ohio	41,436,980	2,233,766	18,550	1,974,254	884	.0477	97	26
Oklahoma	8,676,623	546,550	15,875	334,291	612	.0386	79	44
Oregon	8,166,455	437,173	18,680	413,808	947	.0507	103	21
Pennsylvania	45,184,874	2,193,200	20,602	2,345,450	1,069	.0519	106	17
Rhode Island	3,579,507	180,000	19,886	184,610	1,026	.0516	105	18
South Carolina	7,738,860	579,600	13,352	344,379	594	.0445	91	31

APPENDIX 1, PART B (continued)

State	Net Personal Income 1973 (In Thousands)	Total ADM	Net Personal Income Per ADM	State and Local Educational Expenditures From Own Sources (In Thousands)	State and Local Educational Expenditures Per ADM	State Effort	State Effort as % of U.S. Average	Rank
South Dakota	$ 2,557,808	154,829	$16,520	$ 111,325	$ 719	.0435	89	36
Tennessee	12,424,687	845,000	14,704	524,850	621	.0422	86	39
Texas	40,492,280	2,516,000	16,094	2,301,918	915	.0569	116	8
Utah	3,511,170	287,500	12,213	188,210	655	.0536	109	13
Vermont	1,372,527	100,890	13,604	117,920	1,169	.0859	175	1
Virginia	17,727,140	998,287	17,758	804,142	806	.0454	93	28
Washington	13,593,217	733,200	18,540	597,535	815	.0440	90	35
West Virginia	5,158,635	386,415	13,350	246,959	639	.0479	98	25
Wisconsin	16,491,439	899,252	18,339	974,620	1,084	.0591	121	5
Wyoming	1,265,757	81,500	15,531	68,579	841	.0541	110	12
United States	808,082,204	42,292,182	19,107	39,570,893	936	.0490	100	

APPENDIX 1

PART C

SOURCES OF DATA FOR STATE EFFORT INDEX 1 (STEFIN 1)

Components	Source
Personal Income	Survey of Current Business (Washington, D.C.: U.S. Department of Commerce, August 1974), Table 1, p. 33.
Total Population	Population Estimates and Projections (Washington, D.C.: U.S. Bureau of the Census, November 1973), p. 2.
Subsistence Allowance	Calculated: Total Population multiplied by $750.
Federal Personal Income Tax Paid	Statistics of Income, 1972, Individual Income Tax Returns (Washington, D.C.: Internal Revenue Service, 1974), Table 5.2, p. 226.
Net Personal Income	Calculated: Personal Income minus Subsistence Allowance minus Federal Personal Income Tax Paid.
Total ADM	Statistics of Public Elementary and Secondary Day Schools, Fall 1972 (Washington, D.C.: U.S. Office of Education, 1973), Table 4, p. 16.
Net Personal Income per ADM	Calculated: Net Personal Income divided by Total ADM.
State and Local Educational Expenditures from Own Sources	Calculated: Total Current Expenditures for Public Schools (K-12) minus Federal Revenue Receipts Expenditure and Federal Revenue data from: Estimates of School Statistics, 1972-73 (Washington, D.C.: National

APPENDIX 1, PART C (continued)

Components	Source
	Education Association, 1973), Tables 10 and 12, p. 35.
State and Local Educational Expenditures from Own Sources per ADM	Calculated: Expenditures divided by Total ADM.

APPENDIX 2

PART A

ESTIMATED POTENTIAL YIELD OF CERTAIN STATE TAXES-1973

State	Personal Income Tax at Oregon Rates (In Millions)	Corporate Income Tax at 8% Rate (In Millions)	Sales Tax at 6% - No Exemptions (In Millions)	Sales Tax Improved Administration & Elimination of Vendor Discount (In Millions)	Cigarette Tax at 20¢ Per Pack (In Millions)	Liquor Tax at Per Capita Yield in Vermont (In Millions)	Total (In Millions)
Alabama	235	25	126	17	25	31	459
Alaska	12	1	41	0	4	4	62
Arizona	156	5	177	8	22	35	403
Arkansas	123	38	200	11	4	34	410
California	1,417	46	1,572	22	226	383	3,666
Colorado	154	23	85	11	13	41	327
Connecticut	484	0	223	13	0	54	774
Delaware	0	2	123	0	4	9	138
Florida	992	89	1,095	62	25	37	2,300
Georgia	306	38	536	28	40	46	994
Hawaii	0	4	99	11	10	12	136
Idaho	32	4	74	2	8	14	134
Illinois	974	229	430	54	98	201	1,986
Indiana	456	17	624	12	101	116	1,326
Iowa	146	0	264	7	20	66	503
Kansas	215	42	199	7	21	47	531
Kentucky	200	42	219	16	97	77	651
Louisiana	321	88	343	18	37	56	863
Maine	90	6	88	2	7	8	201
Maryland	122	11	435	16	67	83	734

APPENDIX 2, PART A (continued)

State	Personal Income Tax at Oregon Rates (In Millions)	Corporate Income Tax at 8% Rate (In Millions)	Sales Tax at 6% - No Exemptions (In Millions)	Sales Tax Improved Administration & Elimination of Vendor Discount (In Millions)	Cigarette Tax at 20¢ Per Pack (In Millions)	Liquor Tax at Per Capita Yield in Vermont (In Millions)	Total (In Millions)
Massachusetts	44	17	593	11	25	98	788
Michigan	474	9	668	22	97	164	1,434
Minnesota	0	0	477	9	7	55	548
Mississippi	149	26	97	12	25	47	356
Missouri	337	38	310	25	61	97	868
Montana	14	2	136	0	6	11	169
Nebraska	129	20	158	6	10	30	353
Nevada	88	24	72	2	9	6	201
New Hampshire	94	3	155	0	18	17	287
New Jersey	1,206	78	618	27	8	141	2,076
New Mexico	72	9	86	3	7	20	197
New York	0	0	651	43	97	349	1,140
North Carolina	190	46	319	20	162	64	801
North Dakota	51	6	55	2	5	20	139
Ohio	1,192	56	894	40	56	223	2,461
Oklahoma	217	35	270	12	22	40	596
Oregon	0	17	454	0	33	75	579
Pennsylvania	709	0	667	50	23	221	1,670
Rhode Island	74	0	71	2	9	19	175
South Carolina	108	21	195	13	44	16	397

APPENDIX 2, PART A (continued)

State	Personal Income Tax at Oregon Rates (In Millions)	Corporate Income Tax at 8% Rate (In Millions)	Sales Tax at 6% - No Exemptions (In Millions)	Sales Tax Improved Administration & Elimination of Vendor Discount (In Millions)	Cigarette Tax at 20¢ Per Pack (In Millions)	Liquor Tax at Per Capita Yield in Vermont (In Millions)	Total (In Millions)
South Dakota	81	16	32	3	4	11	147
Tennessee	448	34	206	20	28	79	815
Texas	1,510	364	909	56	18	218	3,075
Utah	89	10	74	4	8	22	207
Vermont	54	3	71	1	4	0	133
Virginia	204	32	292	18	101	77	724
Washington	495	47	206	11	12	31	802
West Virginia	20	4	133	4	14	26	201
Wisconsin	0	58	439	18	17	86	618
Wyoming	47	9	51	2	5	8	122
Total	14,531	1,694	16,312	753	1,764	3,625	38,679

APPENDIX 2

PART B

COMPUTATION OF A BALANCED TAX SYSTEM-1973

State	Total State and Local Tax Revenues (In Millions)	Estimated Potential Yield of Certain State Taxes (In Millions)	Balanced Tax System (In Millions)	Total ADM	Balanced Tax System Per ADM
Alabama	$ 1,243.9	$ 459	$ 1,702.9	733,296	$2,322
Alaska	163,0	62	225.0	80,500	2,795
Arizona	1,145.8	403	1,548.8	428,042	3,618
Arkansas	696.5	410	1,106.5	413,418	2,676
California	15,221.6	3,666	18,887.6	4,407,000	4,286
Colorado	1,323.1	327	3,300.2	537,221	6,143
Connecticut	2,236.9	774	3,010.9	620,694	4,851
Delaware	337.6	138	475.6	123,860	3,840
Florida	3,771.3	2,300	6,071.3	1,398,989	4,340
Georgia	2,073.6	994	3,067.6	1,006,510	3,048
Hawaii	568.7	136	704.7	169,500	4,158
Idaho	344.5	134	478.5	176,500	2,711
Illinois	6,888.0	1,986	8,874.0	2,112,000	4,202
Indiana	2,496.7	1,326	3,822.7	1,101,916	3,469
Iowa	1,538.1	503	2,041.1	619,000	3,297
Kansas	1,178.5	531	1,709.5	452,581	3,777
Kentucky	1,350.0	651	2,001.0	665,000	3,009
Louisiana	1,690.1	863	2,553.1	799,986	3,191
Maine	528.7	201	729.7	232,000	3,145
Maryland	2,558.2	734	3,292.2	834,639	3,944

APPENDIX 2, PART B (continued)

State	Total State and Local Tax Revenues (In Millions)	Estimated Potential Yield of Certain State Taxes (In Millions)	Balanced Tax System (In Millions)	Total ADM	Balanced Tax System Per ADM
Massachusetts	$ 4,153.3	$ 788	$ 4,941.3	1,110,000	$4,452
Michigan	5,744.6	1,434	7,178.6	2,017,319	3,558
Minnesota	2,531.1	548	3,079.1	878,475	3,505
Mississippi	870.6	356	1,226.6	491,800	2,494
Missouri	2,248.5	868	3,116.5	916,400	3,401
Montana	380.2	169	549.2	176,800	3,106
Nebraska	776.0	353	1,129.0	314,208	3,593
Nevada	376.8	201	577.8	121,000	4,775
New Hampshire	358.8	287	645.8	155,300	4,158
New Jersey	4,641.2	2,078	6,719.2	1,390,964	4,831
New Mexico	484.8	197	681.8	267,089	2,553
New York	16,321.8	1,140	17,461.8	3,159,900	5,526
North Carolina	2,242.7	801	3,043.7	1,070,595	2,843
North Dakota	300.3	139	439.3	136,518	3,218
Ohio	5,101.7	2,461	7,562.7	2,233,766	3,386
Oklahoma	1,047.6	596	1,643.6	546,550	3,007
Oregon	1,185.4	579	1,764.4	437,173	4,036
Pennsylvania	6,919.1	1,670	8,589.1	2,193,200	3,916
Rhode Island	527.5	175	702.5	180,000	3,903
South Carolina	1,066.0	397	1,463.0	579,600	2,524

APPENDIX 2, PART B (continued)

State	Total State and Local Tax Revenues (In Millions)	Estimated Potential Yield of Certain State Taxes (In Millions)	Balanced Tax System (In Millions)	Total ADM	Balanced Tax System Per ADM
South Dakota	$ 339.2	$ 147	$ 486.2	154,829	$3,140
Tennessee	1,616.4	815	2,431.4	845,000	2,877
Texas	4,939.0	3,075	8,014.0	2,516,000	3,185
Utah	543.0	207	750.0	287,500	2,609
Vermont	286.9	133	419.9	100,890	4,162
Virginia	2,307.9	724	3,031.9	998,287	3,037
Washington	1,970.7	802	2,772.7	773,200	3,586
West Virginia	746.3	201	947.3	386,415	2,452
Wisconsin	3,035.4	618	3,653.4	899,252	4,063
Wyoming	188.6	122	310.6	81,500	3,811
United States	121,101.6	38,679	159,780.6	42,292,182	3,778

APPENDIX 2

PART C

COMPUTATION OF STATE EFFORT INDEX 2

State	State & Local Educational Expenditures From Own Sources Per ADM	Balanced Tax System Per ADM	State Effort	State Effort as a % of U.S. Average	Rank
Alabama	$ 474	$2,322	.2041	82	41
Alaska	1,180	2,795	.4222	170	1
Arizona	1,121	3,618	.3098	125	3
Arkansas	538	2,676	.2010	81	44
California	897	4,286	.2093	84	40
Colorado	868	6,143	.1413	57	50
Connecticut	1,205	4,851	.2484	100	22
Delaware	1,049	3,840	.2732	110	8
Florida	782	4,340	.1802	73	48
Georgia	697	3,048	.2287	92	33
Hawaii	906	4,158	.2179	88	37
Idaho	666	2,711	.2457	99	23
Illinois	1,053	4,202	.2506	101	20
Indiana	821	3,469	.2367	96	26
Iowa	999	3,297	.3030	122	5
Kansas	816	3,777	.2160	87	38
Kentucky	557	3,009	.1851	75	47
Louisiana	760	3,191	.2382	96	25
Maine	752	3,145	.2391	96	24
Maryland	1,077	3,944	.2731	110	9
Massachusetts	1,053	4,452	.2365	95	27
Michigan	1,114	3,558	.3131	126	2
Minnesota	1,064	3,505	.3036	123	4
Mississippi	470	2,494	.1885	76	45
Missouri	791	3,401	.2326	94	30

APPENDIX 2, PART C (continued)

State	State & Local Educational Expenditures From Own Sources Per ADM	Balanced Tax System Per ADM	State Effort	State Effort as a % of U.S. Average	Rank
Montana	$ 774	$3,106	.2492	101	21
Nebraska	644	3,593	.1792	72	49
Nevada	897	4,775	.1879	76	46
New Hampshire	842	4,158	.2025	82	43
New Jersey	1,227	4,831	.2540	103	17
New Mexico	644	2,553	.2523	102	18
New York	1,481	5,526	.2680	108	11
North Carolina	647	2,843	.2276	92	34
North Dakota	748	3,218	.2324	94	31
Ohio	884	3,386	.2611	105	15
Oklahoma	612	3,007	.2035	82	42
Oregon	947	4,036	.2346	95	29
Pennsylvania	1,069	3,916	.2730	110	10
Rhode Island	1,026	3,903	.2629	106	14
South Carolina	594	2,524	.2353	95	28
South Dakota	719	3,140	.2290	92	32
Tennessee	621	2,877	.2158	87	39
Texas	915	3,185	.2873	116	6
Utah	655	2,609	.2511	101	19
Vermont	1,169	4,162	.2809	113	7
Virginia	806	3,037	.2654	107	13
Washington	815	3,586	.2273	92	35
West Virginia	639	2,452	.2606	105	16
Wisconsin	1,084	4,063	.2668	108	12
Wyoming	841	3,811	.2207	89	36
U.S. Totals	936	3,778	.2478	100	

APPENDIX 2

PART D

SOURCES OF DATA FOR STATE EFFORT INDEX 2 (STEFIN 2)

Components	Source
Additional Revenue Potentials of Certain State Taxes	John Due, "Alternative State and Local Tax Sources for Education," in Public Schools: Educational and Economic Needs by Kern Alexander and K. Forbis Jordan (Gainesville, Florida: The University Presses of Florida, In Press).
Total State and Local Tax Revenues	Governmental Finances in 1972-73 (Washington, D.C.: U.S. Bureau of the Census, 1974), Table 17, p. 31.
Balanced Tax System	Calculated: Total State and Local Tax Revenues plus Additional Revenue Potential of Certain State Taxes.
Total ADM	Statistics of Public Elementary and Secondary Day Schools, Fall 1972.
Balanced Tax System per ADM	Calculated: Balanced Tax System divided by Total ADM.
State and Local Educational Expenditures from Own Sources	Calculated: Total Current Expenditures of Public Schools (K-12) minus Federal Revenue Receipts. Expenditure and Federal Revenue data from: Estimates of Schools Statistics, 1972-73.
State and Local Educational Expenditures from Own Sources per ADM	Calculated: Expenditures divided by Total ADM.

APPENDIX 3

COMPARISON OF STATE EFFORT INDEX 1 AND STATE EFFORT INDEX 2

State	State Effort Index 1	Rank	State Effort Index 2	Rank
Alabama	71	48	82	41
Alaska	126	3	170	1
Arizona	133	2	125	3
Arkansas	75	47	81	44
California	91	31	84	40
Colorado	103	21	57	50
Connecticut	109	14	100	22
Delaware	103	23	110	8
Florida	78	45	73	48
Georgia	89	36	92	33
Hawaii	88	38	88	37
Idaho	92	29	99	23
Illinois	91	33	101	20
Indiana	91	30	96	26
Iowa	105	20	122	5
Kansas	79	43	87	38
Kentucky	76	46	75	47
Louisiana	114	9	96	25
Maine	114	10	96	24
Maryland	108	15	110	9
Massachusetts	102	24	95	27
Michigan	118	7	126	2
Minnesota	122	4	123	4
Mississippi	80	42	76	45
Missouri	85	40	94	30
Montana	107	16	101	21
Nebraska	65	50	72	49
Nevada	91	33	76	46
New Hampshire	96	27	82	43
New Jersey	105	19	103	17

APPENDIX 3 (continued)

State	State Effort Index 1	Rank	State Effort Index 2	Rank
New Mexico	112	11	102	18
New York	118	6	108	11
North Carolina	84	41	92	34
North Dakota	69	49	94	31
Ohio	97	26	105	15
Oklahoma	79	44	82	42
Oregon	103	21	95	29
Pennsylvania	106	17	110	10
Rhode Island	105	18	106	14
South Carolina	91	31	95	28
South Dakota	89	36	92	32
Tennessee	86	39	87	39
Texas	116	8	116	6
Utah	109	13	101	19
Vermont	175	1	113	7
Virginia	93	28	107	13
Washington	90	35	92	35
West Virginia	98	25	105	16
Wisconsin	121	5	108	12
Wyoming	110	12	89	36
United States	100		100	

APPENDIX 4

RANK ORDER OF STATES ACCORDING TO FISCAL CAPACITY

State	Net Personal Income Per ADM	State	Balanced Tax System Per ADM
New York	$25,554	Colorado	$ 6,143
New Jersey	23,824	New York	5,526
Illinois	23,716	Connecticut	4,851
Connecticut	22,567	New Jersey	4,831
North Dakota	22,008	Nevada	4,775
Massachusetts	21,032	Massachusetts	4,452
Hawaii	20,970	Florida	4,340
Kansas	20,966	California	4,286
Delaware	20,789	Illinois	4,202
Pennsylvania	20,602	Vermont	4,162
Florida	20,515	Hawaii	4,158
Maryland	20,379	New Hampshire	4,158
Nebraska	20,322	Wisconsin	4,063
Nevada	20,204	Oregon	4,036
California	20,156	Maryland	3,944
Rhode Island	19,886	Pennsylvania	3,916
Iowa	19,482	Rhode Island	3,903
Michigan	19,252	Delaware	3,840
Alaska	19,139	Wyoming	3,811
Missouri	19,054	Kansas	3,777
Oregon	18,680	Arizona	3,618
Ohio	18,550	Nebraska	3,593
Washington	18,540	Washington	3,586
Wisconsin	18,339	Michigan	3,558
Indiana	18,318	Minnesota	3,505
New Hampshire	17,951	Indiana	3,469
Minnesota	17,769	Missouri	3,401
Virginia	17,758	Ohio	3,386
Arizona	17,170	Iowa	3,297
Colorado	17,110	North Dakota	3,218

APPENDIX 4 (continued)

State	Net Personal Income Per ADM	State	Balanced Tax System Per ADM
South Dakota	$16,520	Louisiana	$ 3,191
Texas	16,094	Texas	3,185
Oklahoma	15,875	Maine	3,145
North Carolina	15,735	South Dakota	3,140
Georgia	15,599	Montana	3,106
Wyoming	15,531	Georgia	3,048
Kentucky	14,890	Virginia	3,037
Idaho	14,793	Kentucky	3,009
Montana	14,775	Oklahoma	3,007
Tennessee	14,704	Tennessee	2,877
Arkansas	14,590	North Carolina	2,843
Alabama	13,678	Alaska	2,795
Vermont	13,604	Idaho	2,711
Louisiana	13,538	Arkansas	2,676
Maine	13,479	Utah	2,609
South Carolina	13,352	New Mexico	2,553
West Virginia	13,350	South Carolina	2,524
Utah	12,213	Mississippi	2,494
Mississippi	11,974	West Virginia	2,452
New Mexico	11,738	Alabama	2,322
U.S. Average	17,732	U.S. Average	3,570

APPENDIX 5

SOURCES OF DATA FOR THE INDEPENDENT VARIABLES

Variable Number	Variable Name and Source
Income Variables	
VAR005	Per Capita Personal Income, 1973 Source: *Survey of Current Business* (Washington, D.C.: U.S. Department of Commerce, August 1974), Table 2, p. 33.
VAR027	Percent Families with Less Than Poverty Level Income, 1970 Source: *Census of the Population: 1970, General Social and Economic Characteristics: U.S. Summary* (Washington, D.C.: U.S. Bureau of the Census, 1970), p. 545.
VAR031	Median Family Income, 1970 Source: *Census of the Population: 1970, General Social and Economic Characteristics: U.S. Summary*, p. 539.
VAR032	Percent of Families with Incomes of $15,000 and Up, 1970 Source: *Census of the Population: 1970, General Social and Economic Characteristics: U.S. Summary*, p. 539.
Public Education Variables	
VAR006	Percent of Public School Revenue from Local Governments, 1972-73 Source: *Ranking of the States, 1973* (Washington, D.C.: National Education Association, 1973), Table G-6, p. 49.
VAR007	Percent of Public School Revenue from State Governments, 1972-73 Source: *Ranking of the States*, 1973, Table G-7, p. 50.

APPENDIX 5 (continued)

Variable Number	Variable Name and Source
VAR008	Percent of Public School Revenue from Federal Government Source: Ranking of the States, 1973, Table G-10, p. 51.
VAR010	Nonpublic School Enrollment as a Percent of Total School Enrollment, 1970-71 Source: Statistics of Non Public Elementary and Secondary Schools, 1970-71 (Washington, D.C.: U.S. Office of Education, 1972), Table ii, pp. 28-29.
VAR012	Enrollment in Grades 9-12 as a Percent of Total Public School Enrollment, 1972-73 Source: Calculated Total Enrollment and Total 9-12 Enrollment data from: Statistics of Elementary and Secondary Day Schools, Fall, 1972 (Washington, D.C.: U.S. Office of Education, 1972), pp. 18-19.
VAR016	School Age Population as a Percent of Total Resident Population, 1972-73 Source: Ranking of the States, 1973, Table A-6, p. 9.
VAR017	Percent Change in Public Elementary and Secondary Enrollment from 1962-63 to 1972-73 Source: Ranking of the States, 1973, Table B-5, p. 16.
VAR021	Public High School Graduates in 1972 as a Percent of Ninth Graders in Fall 1968 Source: Ranking of the States, 1973, Table D-6, p. 13.
VAR023	Local Basic Administrative Units Per 10,000 ADM, 1972-73 Source: Calculated Local Basic Administrative Units and ADM data from: Statistics of Elementary and Secondary Day Schools, Fall, 1972, pp. 13 and 16.
VAR025	Pupil-Teacher Ratio in ADA, 1972-73 Source: Statistics of Elementary and Secondary Day Schools, Fall, 1972, p. 23.

APPENDIX 5 (continued)

Variable Number	Variable Name and Source
Demographic Variables	
VAR009	Percent Civilian Labor Force Unemployed, 1970 Source: *Census of the Population: 1970, General Social and Economic Characteristics*, Table 141, p. 469.
VAR011	Population Per Square Mile, 1972 Source: *Ranking of the States, 1973*, Table A-13, p. 30.
VAR018	Percent of the Population Ages 25 and Older with Less Than Five Years of Schooling, 1970 Source: *Ranking of the States, 1973*, Table D-1, p. 30.
VAR019	Percent of the Population Age 25 and Older with Four Years of High School or More, 1970 Source: *Ranking of the States, 1973*, Table D-3, p. 30.
VAR020	Median Years of Schooling Completed by the Population 25 Years and Older, 1970 Source: *Ranking of the States, 1973*, Table D-5, p. 31.
VAR026	Percent Population Increase, 1960-70 Source: *Census of the Population: 1970, Number of Inhabitants - United States Summary* (Washington, D.C.: U.S. Bureau of the Census, 1970).
VAR028	Percent Population in SMSA, 1970 Source: *Census of the Population: 1970, Number of Inhabitants*, pp. 206-212.
VAR030	Percent of Population Rural, 1970 Source: *Census of the Population: 1970, Number of Inhabitants*, pp. 206-212.
VAR034	Percent of the Population Nonwhite, 1970 Source: *Census of the Population: 1970, General Population Characteristics - United States Summary* (Washington, D.C.: U. S. Bureau of the Census, 1970), Table 59, p. 292.

APPENDIX 5 (continued)

Variable Number	Variable Name and Source
VAR036	Percent of the Population Age 65 Years and Over, 1970 Source: *Census of the Population: 1970, General Population Characteristics*, Table 59, p. 292.
Other Governmental Functions	
VAR001	State and Local Per Capita Expenditures for Public Welfare, 1973 Source: *Governmental Finances in 1972-73* (Washington, D.C.: U.S. Bureau of the Census, 1973), Table 22, p. 47.
VAR002	State and Local Per Capita Expenditures for Health and Hospitals, 1973 Source: *Governmental Finances in 1972-73*, Table 22, p. 47.
VAR003	State and Local Per Capita Expenditures for Police and Fire Protection, 1973 Source: *Governmental Finances in 1972-73*, Table 22, p. 47.
VAR004	State and Local Per Capita Expenditures for Sewage and Sanitation, 1973 Source: *Governmental Finances in 1972-73*, Table 22, p. 47.
VAR013	General Revenue Sharing Funds Per Capita, 1973 Source: Calculated General Revenue Sharing data from *State Finances in 1973* (Washington, D.C.: U.S. Bureau of the Census, 1974), Table 7, p. 22. 1973 Population data from *Governmental Finances in 1972-73*, Table 26, p. 52.
VAR014	State and Local Per Capita Expenditures for Higher Education, 1973 Source: *Governmental Finances in 1972-73*, Table 22, p. 46.

APPENDIX 5 (continued)

Variable Number	Variable Name and Source
VAR015	State and Local Per Capita Expenditures for Highways, 1973 Source: Governmental Finances in 1972-73, Table 22, p. 46.
VAR040	Total State and Local Debt Outstanding Per Capita, 1973 Source: Governmental Finances in 1972-73, Table 22, p. 48.
GOVT	Sum of VAR001 through VAR004 and VAR015

APPENDIX 6

PEARSON CORRELATION MATRIX OF THE TWENTY-EIGHT SOCIOECONOMIC VARIABLES, STEFIN 1, AND STEFIN 2

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            VAR005     VAR006     VAR007     VAR008     VAR009     VAR010     VAR011     VAR012     VAR013     VAR014

VAR005      1.0000     0.3150    -0.1655    -0.6239    -0.0205     0.3669     0.3886     0.1629    -0.4076     0.2587
           (    0)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.001    S=0.013    S=0.125    S=0.001    S=0.444    S=0.004    S=0.003    S=0.129    S=0.002    S=0.035

VAR006      0.3150     1.0000    -0.9711    -0.6560    -0.2004     0.3268     0.2121     0.3241    -0.0554    -0.2134
           (   50)    (    0)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.013    S=0.001    S=0.001    S=0.001    S=0.081    S=0.010    S=0.070    S=0.011    S=0.351    S=0.068

VAR007     -0.1655    -0.9711     1.0000     0.4805     0.1653    -0.2442    -0.1358    -0.2913    -0.0570     0.2532
           (   50)    (   50)    (    0)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.125    S=0.001    S=0.001    S=0.001    S=0.126    S=0.044    S=0.174    S=0.020    S=0.347    S=0.038

VAR008     -0.6239    -0.6560     0.4805     1.0000     0.2082    -0.3963    -0.2621    -0.3537     0.3993    -0.1008
           (   50)    (   50)    (   50)    (    0)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.001    S=0.001    S=0.001    S=0.001    S=0.073    S=0.002    S=0.033    S=0.006    S=0.002    S=0.243

VAR009     -0.0205    -0.2004     0.1653     0.2082     1.0000    -0.4028    -0.2795    -0.0691     0.0992     0.3666
           (   50)    (   50)    (   50)    (   50)    (    0)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.444    S=0.081    S=0.126    S=0.073    S=0.001    S=0.002    S=0.025    S=0.317    S=0.247    S=0.004

VAR010      0.3669     0.3268    -0.2442    -0.3963    -0.4028     1.0000     0.6002     0.1355     0.0536    -0.2159
           (   50)    (   50)    (   50)    (   50)    (   50)    (    0)    (   50)    (   50)    (   50)    (   50)
           S=0.004    S=0.010    S=0.044    S=0.002    S=0.002    S=0.001    S=0.001    S=0.174    S=0.356    S=0.066

VAR011      0.3886     0.2121    -0.1358    -0.2621    -0.2795     0.6002     1.0000    -0.1151    -0.0222    -0.3286
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (    0)    (   50)    (   50)    (   50)
           S=0.003    S=0.070    S=0.174    S=0.033    S=0.025    S=0.001    S=0.001    S=0.213    S=0.439    S=0.010

VAR012      0.1629     0.3241    -0.2913    -0.3537    -0.0691     0.1355    -0.1151     1.0000     0.0281     0.0453
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (    0)    (   50)    (   50)
           S=0.129    S=0.011    S=0.020    S=0.006    S=0.317    S=0.174    S=0.213    S=0.001    S=0.423    S=0.377

VAR013     -0.4076    -0.0554    -0.0570     0.3993     0.0992     0.0536    -0.0222     0.0281     1.0000    -0.0899
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (    0)    (   50)
           S=0.002    S=0.351    S=0.347    S=0.002    S=0.247    S=0.356    S=0.439    S=0.423    S=0.001    S=0.267

VAR014      0.2587    -0.2134     0.2532    -0.1008     0.3666    -0.2159    -0.3286     0.0453    -0.0899     1.0000
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (    0)
           S=0.035    S=0.068    S=0.038    S=0.243    S=0.004    S=0.066    S=0.010    S=0.377    S=0.267    S=0.001

VAR016     -0.3311    -0.2833     0.2608     0.2437     0.1700    -0.0927    -0.2005    -0.2151     0.1821     0.2315
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.009    S=0.023    S=0.034    S=0.044    S=0.119    S=0.261    S=0.081    S=0.067    S=0.103    S=0.053
```

APPENDIX 6 (continued)

	VAR005	VAR006	VAR007	VAR008	VAR009	VAR010	VAR011	VAR012	VAR013	VAR014
VAR017	0.4785 (50) S=0.001	0.1042 (50) S=0.236	0.0090 (50) S=0.475	-0.4004 (50) S=0.002	0.1438 (50) S=0.160	0.2041 (50) S=0.078	0.2723 (50) S=0.028	-0.3694 (50) S=0.004	-0.1751 (50) S=0.112	0.3472 (50) S=0.007
VAR018	-0.5361 (50) S=0.001	-0.6790 (50) S=0.001	0.5716 (50) S=0.001	0.7668 (50) S=0.001	-0.0556 (50) S=0.351	-0.1705 (50) S=0.118	-0.0470 (50) S=0.373	-0.4576 (50) S=0.001	0.1929 (50) S=0.090	-0.2647 (50) S=0.032
VAR019	0.5372 (50) S=0.001	0.3668 (50) S=0.004	-0.2686 (50) S=0.030	-0.5802 (50) S=0.001	0.2934 (50) S=0.019	-0.0271 (50) S=0.426	-0.0881 (50) S=0.271	0.1815 (50) S=0.104	-0.3537 (50) S=0.006	0.5940 (50) S=0.001
VAR020	0.6274 (50) S=0.001	0.4742 (50) S=0.001	-0.3578 (50) S=0.005	-0.6722 (50) S=0.001	0.1047 (50) S=0.235	0.1620 (50) S=0.131	0.0494 (50) S=0.367	0.2804 (50) S=0.024	-0.3654 (50) S=0.005	0.4482 (50) S=0.001
VAR021	0.5915 (50) S=0.001	0.4047 (50) S=0.002	-0.2889 (50) S=0.021	-0.6178 (50) S=0.001	-0.0474 (50) S=0.372	0.2181 (50) S=0.064	0.0996 (50) S=0.246	0.5370 (50) S=0.001	-0.2453 (50) S=0.043	0.3818 (50) S=0.003
VAR023	0.0784 (50) S=0.294	0.2366 (50) S=0.049	-0.2587 (50) S=0.035	-0.0766 (50) S=0.299	-0.1744 (50) S=0.113	0.0854 (50) S=0.278	-0.1199 (50) S=0.203	0.0926 (50) S=0.261	-0.0156 (50) S=0.457	0.0080 (50) S=0.478
VAR025	-0.2702 (48) S=0.032	-0.4468 (48) S=0.001	0.4153 (48) S=0.002	0.2797 (48) S=0.027	0.2701 (48) S=0.032	-0.4871 (48) S=0.001	-0.2412 (48) S=0.049	-0.0266 (48) S=0.429	-0.1244 (48) S=0.200	-0.0698 (48) S=0.319
VAR026	0.3894 (50) S=0.003	-0.0615 (50) S=0.336	0.1437 (50) S=0.160	-0.2543 (50) S=0.037	0.1604 (50) S=0.133	-0.1287 (50) S=0.187	0.0383 (50) S=0.396	-0.3434 (50) S=0.007	-0.3969 (50) S=0.002	0.2046 (50) S=0.077
VAR027	-0.7690 (50) S=0.001	-0.5417 (50) S=0.001	0.3603 (50) S=0.005	0.8860 (50) S=0.001	0.0702 (50) S=0.314	-0.3621 (50) S=0.005	-0.3551 (50) S=0.006	-0.2572 (50) S=0.036	0.4339 (50) S=0.001	-0.2657 (50) S=0.031
VAR028	0.4465 (50) S=0.001	0.0612 (50) S=0.336	0.0742 (50) S=0.304	-0.4650 (50) S=0.001	-0.2303 (50) S=0.054	0.4095 (50) S=0.002	0.5144 (50) S=0.001	0.0506 (50) S=0.364	-0.4063 (50) S=0.002	-0.1819 (50) S=0.103
VAR030	-0.5257 (50) S=0.001	-0.1605 (50) S=0.133	0.0418 (50) S=0.387	0.4885 (50) S=0.001	0.0564 (50) S=0.349	-0.3911 (50) S=0.002	-0.4853 (50) S=0.001	-0.1224 (50) S=0.199	0.3956 (50) S=0.002	-0.0334 (50) S=0.409

APPENDIX 6 (continued)

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            VAR005     VAR006     VAR007     VAR008     VAR009     VAR010     VAR011     VAR012     VAR013     VAR014

VAR031       0.6841     0.2329    -0.0941    -0.5493     0.1555     0.3909     0.3750     0.0927    -0.2705     0.3332
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    ( [illegible]
            S=0.001    S=0.052    S=0.258    S=0.001    S=0.140    S=0.003    S=0.004    S=0.261    S=0.029    [illegible]

VAR032       0.8267     0.0615     0.0986    -0.4961     0.1308     0.3353     0.4521    -0.1564    -0.4446     0.3709
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.001    S=0.336    S=0.248    S=0.001    S=0.183    S=0.009    S=0.001    S=0.139    S=0.001    S=0.004

VAR034      -0.1118    -0.7024     0.6793     0.4922    -0.0991    -0.0342    -0.0328    -0.3725    -0.2141     0.0860
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.220    S=0.001    S=0.001    S=0.001    S=0.247    S=0.407    S=0.411    S=0.004    S=0.068    S=0.276

VAR036      -0.1573     0.4906    -0.5172    -0.1783    -0.3344     0.2783     0.0742     0.4175     0.1327    -0.5426
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.138    S=0.001    S=0.001    S=0.108    S=0.009    S=0.025    S=0.304    S=0.001    S=0.179    S=0.001

VAR040       0.4887    -0.2331     0.3283    -0.1068     0.2698     0.2619     0.2629    -0.3490    -0.2025     0.3427
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.001    S=0.052    S=0.010    S=0.230    S=0.029    S=0.033    S=0.033    S=0.006    S=0.079    S=0.007

GOVT         0.5177    -0.1267     0.2071    -0.1814     0.4547     0.1479     0.2025    -0.2396    -0.1002     0.4377
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.001    S=0.190    S=0.074    S=0.104    S=0.001    S=0.153    S=0.079    S=0.047    S=0.244    S=0.001

STEFIN1      0.0487     0.1111    -0.0239    -0.3376     0.1368     0.2033     0.1098    -0.2196     0.1256     0.3044
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.368    S=0.221    S=0.435    S=0.008    S=0.172    S=0.078    S=0.224    S=0.063    S=0.192    S=0.016

STEFIN2      0.2818    -0.1349     0.2288    -0.1332     0.2659     0.0913     0.1184    -0.1857     0.0847     0.3393
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.024    S=0.175    S=0.055    S=0.178    S=0.031    S=0.264    S=0.206    S=0.097    S=0.279    S=0.008
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APPENDIX 6 (continued)

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            VAR016    VAR017    VAR018    VAR019    VAR020    VAR021    VAR023    VAR025    VAR026    VAR027

VAR005     -0.3311    0.4785   -0.5361    0.5372    0.6274    0.5915    0.0784   -0.2702    0.3894   -0.7690
           (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    48)   (    50)   (    50)
           S=0.009   S=0.001   S=0.001   S=0.001   S=0.001   S=0.001   S=0.294   S=0.032   S=0.003   S=0.001

VAR006     -0.2833    0.1042   -0.6790    0.3668    0.4742    0.4047    0.2366   -0.4468   -0.0615   -0.5417
           (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    48)   (    50)   (    50)
           S=0.023   S=0.236   S=0.001   S=0.004   S=0.001   S=0.002   S=0.049   S=0.001   S=0.336   S=0.001

VAR007      0.2608    0.0090    0.5716   -0.2686   -0.3578   -0.2889   -0.2587    0.4153    0.1437    0.3603
           (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    48)   (    50)   (    50)
           S=0.034   S=0.475   S=0.001   S=0.030   S=0.005   S=0.021   S=0.035   S=0.002   S=0.160   S=0.005

VAR008      0.2437   -0.4004    0.7668   -0.5802   -0.6722   -0.6178   -0.0766    0.2797   -0.2543    0.8860
           (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    48)   (    50)   (    50)
           S=0.044   S=0.002   S=0.001   S=0.001   S=0.001   S=0.001   S=0.299   S=0.027   S=0.037   S=0.001

VAR009      0.1700    0.1438   -0.0556    0.2934    0.1047   -0.0474   -0.1744    0.2701    0.1604    0.0702
           (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    48)   (    50)   (    50)
           S=0.119   S=0.160   S=0.351   S=0.019   S=0.235   S=0.372   S=0.113   S=0.032   S=0.133   S=0.314

VAR010     -0.0927    0.2041   -0.1705   -0.0271    0.1620    0.2181    0.0854   -0.4871   -0.1287   -0.3621
           (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    48)   (    50)   (    50)
           S=0.261   S=0.078   S=0.118   S=0.426   S=0.131   S=0.064   S=0.278   S=0.001   S=0.187   S=0.005

VAR011     -0.2005    0.2723   -0.0470   -0.0881    0.0494    0.0996   -0.1199   -0.2412    0.0383   -0.3551
           (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    48)   (    50)   (    50)
           S=0.081   S=0.028   S=0.373   S=0.271   S=0.367   S=0.246   S=0.203   S=0.049   S=0.396   S=0.006

VAR012     -0.2151   -0.3694   -0.4576    0.1815    0.2804    0.5370    0.0926   -0.0266   -0.3434   -0.2572
           (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    48)   (    50)   (    50)
           S=0.067   S=0.004   S=0.001   S=0.104   S=0.024   S=0.001   S=0.261   S=0.429   S=0.007   S=0.036

VAR013      0.1821   -0.1751    0.1929   -0.3537   -0.3654   -0.2453   -0.0156   -0.1244   -0.3969    0.4339
           (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    48)   (    50)   (    50)
           S=0.103   S=0.112   S=0.090   S=0.006   S=0.005   S=0.043   S=0.457   S=0.200   S=0.002   S=0.001

VAR014      0.2315    0.3472   -0.2647    0.5940    0.4482    0.3818    0.0080   -0.0698    0.2046   -0.2657
           (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    48)   (    50)   (    50)
           S=0.053   S=0.007   S=0.032   S=0.001   S=0.001   S=0.003   S=0.478   S=0.319   S=0.077   S=0.031

VAR016      1.0000   -0.0176    0.1823    0.0261   -0.0801   -0.1609   -0.0215    0.2263   -0.0648    0.2139
           (     0)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    48)   (    50)   (    50)
           S=0.001   S=0.452   S=0.103   S=0.429   S=0.290   S=0.132   S=0.441   S=0.061   S=0.328   S=0.068
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APPENDIX 6 (continued)

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           VAR016    VAR017    VAR018    VAR019    VAR020    VAR021    VAR023    VAR025    VAR026    VAR027

VAR017    -0.0176    1.0000   -0.3202    0.4775    0.4657    0.1754   -0.0841   -0.1590    0.6890   -0.5505
          (   50)   (    0)   (   50)   (   50)   (   50)   (   50)   (   50)   (   48)   (   50)   (   50)
          S=0.452   S=0.001   S=0.012   S=0.001   S=0.001   S=0.112   S=0.281   S=0.140   S=0.001   S=0.001

VAR018     0.1823   -0.3202    1.0000   -0.7839   -0.8247   -0.7226   -0.1644    0.2808   -0.1214    0.8239
          (   50)   (   50)   (    0)   (   50)   (   50)   (   50)   (   50)   (   48)   (   50)   (   50)
          S=0.103   S=0.012   S=0.001   S=0.001   S=0.001   S=0.001   S=0.127   S=0.027   S=0.200   S=0.001

VAR019     0.0261    0.4775   -0.7839    1.0000    0.9133    0.6368    0.1393   -0.1394    0.3983   -0.7304
          (   50)   (   50)   (   50)   (    0)   (   50)   (   50)   (   50)   (   48)   (   50)   (   50)
          S=0.429   S=0.001   S=0.001   S=0.001   S=0.001   S=0.001   S=0.167   S=0.172   S=0.002   S=0.001

VAR020    -0.0801    0.4657   -0.8247    0.9133    1.0000    0.6846    0.1109   -0.2598    0.3138   -0.8083
          (   50)   (   50)   (   50)   (   50)   (    0)   (   50)   (   50)   (   48)   (   50)   (   50)
          S=0.290   S=0.001   S=0.001   S=0.001   S=0.001   S=0.001   S=0.222   S=0.037   S=0.013   S=0.001

VAR021    -0.1609    0.1754   -0.7226    0.6368    0.6846    1.0000    0.1362   -0.1845   -0.0395   -0.7100
          (   50)   (   50)   (   50)   (   50)   (   50)   (    0)   (   50)   (   48)   (   50)   (   50)
          S=0.132   S=0.112   S=0.001   S=0.001   S=0.001   S=0.001   S=0.173   S=0.105   S=0.393   S=0.001

VAR023    -0.0215   -0.0841   -0.1644    0.1393    0.1109    0.1362    1.0000   -0.1775   -0.1177   -0.0390
          (   50)   (   50)   (   50)   (   50)   (   50)   (   50)   (    0)   (   48)   (   50)   (   50)
          S=0.441   S=0.281   S=0.127   S=0.167   S=0.222   S=0.173   S=0.001   S=0.114   S=0.208   S=0.394

VAR025     0.2263   -0.1590    0.2808   -0.1394   -0.2598   -0.1845   -0.1775    1.0000    0.2585    0.2716
          (   48)   (   48)   (   48)   (   48)   (   48)   (   48)   (   48)   (    0)   (   48)   (   48)
          S=0.061   S=0.140   S=0.027   S=0.172   S=0.037   S=0.105   S=0.114   S=0.001   S=0.038   S=0.031

VAR026    -0.0648    0.6890   -0.1214    0.3983    0.3138   -0.0395   -0.1177    0.2585    1.0000   -0.3345
          (   50)   (   50)   (   50)   (   50)   (   50)   (   50)   (   50)   (   48)   (    0)   (   50)
          S=0.328   S=0.001   S=0.200   S=0.002   S=0.013   S=0.393   S=0.208   S=0.038   S=0.001   S=0.009

VAR027     0.2139   -0.5505    0.8239   -0.7304   -0.8083   -0.7100   -0.0390    0.2716   -0.3345    1.0000
          (   50)   (   50)   (   50)   (   50)   (   50)   (   50)   (   50)   (   48)   (   50)   (    0)
          S=0.068   S=0.001   S=0.001   S=0.001   S=0.001   S=0.001   S=0.394   S=0.031   S=0.009   S=0.001

VAR028    -0.1212    0.2703   -0.0660    0.0981    0.1963    0.1564   -0.1227    0.2483    0.4346   -0.4124
          (   50)   (   50)   (   50)   (   50)   (   50)   (   50)   (   50)   (   48)   (   50)   (   50)
          S=0.201   S=0.029   S=0.324   S=0.249   S=0.086   S=0.139   S=0.198   S=0.044   S=0.001   S=0.001

VAR030     0.1052   -0.3629    0.2733   -0.4066   -0.4853   -0.3385    0.0696   -0.0499   -0.4245    0.5217
          (   50)   (   50)   (   50)   (   50)   (   50)   (   50)   (   50)   (   48)   (   50)   (   50)
          S=0.234   S=0.005   S=0.027   S=0.002   S=0.001   S=0.008   S=0.316   S=0.368   S=0.001   S=0.001
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APPENDIX 6 (continued)

	VAR016	VAR017	VAR018	VAR019	VAR020	VAR021	VAR023	VAR025	VAR026	VAR027
VAR031	-0.0439 (50) S=0.381	0.5495 (50) S=0.001	-0.5332 (50) S=0.001	0.5971 (50) S=0.001	0.6235 (50) S=0.001	0.5493 (50) S=0.001	-0.0481 (50) S=0.370	-0.2286 (48) S=0.059	0.3499 (50) S=0.006	-0.7262 (50) S=0.001
VAR032	-0.0150 (50) S=0.459	0.6642 (50) S=0.001	-0.3296 (50) S=0.010	0.5405 (50) S=0.001	0.5658 (50) S=0.001	0.4136 (50) S=0.001	-0.1082 (50) S=0.227	-0.1063 (48) S=0.236	0.5331 (50) S=0.001	-0.7082 (50) S=0.001
VAR034	0.1998 (50) S=0.082	-0.1557 (50) S=0.140	0.7257 (50) S=0.001	-0.3763 (50) S=0.004	-0.4046 (50) S=0.002	-0.3818 (50) S=0.003	-0.1505 (50) S=0.148	0.2283 (48) S=0.059	0.1166 (50) S=0.210	0.4360 (50) S=0.001
VAR036	-0.3915 (50) S=0.002	-0.3573 (50) S=0.005	-0.2294 (50) S=0.055	-0.1934 (50) S=0.089	-0.0587 (50) S=0.343	0.0306 (50) S=0.417	0.2013 (50) S=0.081	-0.3323 (48) S=0.011	-0.4356 (50) S=0.001	0.0570 (50) S=0.347
VAR040	0.0218 (50) S=0.440	0.5309 (50) S=0.001	-0.0134 (50) S=0.463	0.2575 (50) S=0.036	0.1635 (50) S=0.128	0.0443 (50) S=0.390	0.1363 (50) S=0.173	-0.2577 (48) S=0.039	0.3239 (50) S=0.011	-0.2878 (50) S=0.021
GOVT	0.0250 (50) S=0.432	0.4697 (50) S=0.001	-0.1646 (50) S=0.127	0.4106 (50) S=0.002	0.3247 (50) S=0.011	0.1206 (50) S=0.202	-0.0958 (50) S=0.254	-0.2002 (48) S=0.086	0.3218 (50) S=0.011	-0.3735 (50) S=0.004
STEFIN1	0.2887 (50) S=0.021	0.5353 (50) S=0.001	-0.2439 (50) S=0.044	0.3170 (50) S=0.012	0.3410 (50) S=0.008	0.0659 (50) S=0.325	-0.2337 (50) S=0.051	-0.2934 (48) S=0.021	0.1566 (50) S=0.139	-0.3501 (50) S=0.006
STEFIN2	0.2241 (50) S=0.059	0.4427 (50) S=0.001	-0.1265 (50) S=0.191	0.1696 (50) S=0.119	0.2358 (50) S=0.050	0.1876 (50) S=0.096	-0.2033 (50) S=0.078	-0.1577 (48) S=0.142	0.0226 (50) S=0.438	-0.2885 (50) S=0.021

APPENDIX 6 (continued)

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            VAR028     VAR030     VAR031     VAR032     VAR034     VAR036     VAR040     GOVT       STEFIN1    STEFIN2

VAR005      0.4465    -0.5257     0.6841     0.8267    -0.1118    -0.1573     0.4887     0.5177     0.0487     0.2818
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.001    S=0.001    S=0.001    S=0.001    S=0.220    S=0.138    S=0.001    S=0.001    S=0.368    S=0.024

VAR006      0.0612    -0.1605     0.2329     0.0615    -0.7024     0.4906    -0.2331    -0.1267     0.1111    -0.1349
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.336    S=0.133    S=0.052    S=0.336    S=0.001    S=0.001    S=0.052    S=0.190    S=0.221    S=0.175

VAR007      0.0742     0.0418    -0.0941     0.0986     0.6793    -0.5172     0.3283     0.2071    -0.0239     0.2288
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.304    S=0.337    S=0.258    S=0.248    S=0.001    S=0.001    S=0.010    S=0.074    S=0.435    S=0.055

VAR008     -0.4650     0.4885    -0.5493    -0.4961     0.4922    -0.1783    -0.1068    -0.1814    -0.3376    -0.1332
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.001    S=0.001    S=0.001    S=0.001    S=0.001    S=0.108    S=0.230    S=0.104    S=0.008    S=0.178

VAR009     -0.2303     0.0564     0.1555     0.1308    -0.0991    -0.3344     0.2698     0.4547     0.1368     0.2659
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.054    S=0.349    S=0.140    S=0.183    S=0.247    S=0.009    S=0.029    S=0.001    S=0.172    S=0.031

VAR010      0.4095    -0.3911     0.3909     0.3353    -0.0342     0.2783     0.2619     0.1479     0.2033     0.0913
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.002    S=0.002    S=0.003    S=0.009    S=0.407    S=0.025    S=0.033    S=0.153    S=0.078    S=0.264

VAR011      0.5144    -0.4853     0.3750     0.4521    -0.0328     0.0742     0.2629     0.2025     0.1098     0.1184
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.001    S=0.001    S=0.004    S=0.001    S=0.411    S=0.304    S=0.033    S=0.079    S=0.224    S=0.206

VAR012      0.0506    -0.1224     0.0927    -0.1564    -0.3725     0.4175    -0.3490    -0.2396    -0.2196    -0.1867
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.364    S=0.199    S=0.261    S=0.139    S=0.004    S=0.001    S=0.006    S=0.047    S=0.063    S=0.097

VAR013     -0.4063     0.3956    -0.2705    -0.4446    -0.2141     0.1327    -0.2025    -0.1002     0.1256     0.0847
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.002    S=0.002    S=0.029    S=0.001    S=0.068    S=0.179    S=0.079    S=0.244    S=0.192    S=0.279

VAR014     -0.1819    -0.0334     0.3332     0.3709     0.0860    -0.5426     0.3427     0.4377     0.3044     0.3393
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.103    S=0.409    S=0.009    S=0.004    S=0.276    S=0.001    S=0.007    S=0.001    S=0.016    S=0.008

VAR016     -0.1212     0.1052    -0.0439    -0.0150     0.1998    -0.3915     0.0218     0.0250     0.2887     0.2241
           (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
           S=0.201    S=0.234    S=0.381    S=0.459    S=0.082    S=0.002    S=0.440    S=0.432    S=0.021    S=0.059
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APPENDIX 6 (continued)

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            VAR028     VAR030     VAR031     VAR032     VAR034     VAR036     VAR040     GOVT       STEFIN1    STEFIN2

VAR017       0.2703    -0.3629     0.5495     0.6642    -0.1557    -0.3573     0.5309     0.4697     0.5353     0.4427
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.029    S=0.005    S=0.001    S=0.001    S=0.140    S=0.005    S=0.001    S=0.001    S=0.001    S=0.001

VAR018      -0.0660     0.2733    -0.5332    -0.3296     0.7257    -0.2294    -0.0134    -0.1646    -0.2439    -0.1265
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.324    S=0.027    S=0.001    S=0.010    S=0.001    S=0.055    S=0.463    S=0.127    S=0.044    S=0.191

VAR019       0.0981    -0.4066     0.5971     0.5405    -0.3763    -0.1934     0.2575     0.4106     0.3170     0.1696
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.249    S=0.002    S=0.001    S=0.001    S=0.004    S=0.089    S=0.036    S=0.002    S=0.012    S=0.119

VAR020       0.1963    -0.4853     0.6235     0.5658    -0.4046    -0.0587     0.1635     0.3247     0.3410     0.2358
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.086    S=0.001    S=0.001    S=0.001    S=0.002    S=0.343    S=0.128    S=0.011    S=0.008    S=0.050

VAR021       0.1564    -0.3385     0.5493     0.4136    -0.3818     0.0306     0.0443     0.1206     0.0659     0.1876
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.139    S=0.008    S=0.001    S=0.001    S=0.003    S=0.417    S=0.380    S=0.202    S=0.325    S=0.096

VAR023      -0.1227     0.0696    -0.0481    -0.1082    -0.1505     0.2013     0.1363    -0.0958    -0.2337    -0.2033
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.198    S=0.316    S=0.370    S=0.227    S=0.148    S=0.081    S=0.173    S=0.254    S=0.051    S=0.078

VAR025       0.2483    -0.0499    -0.2286    -0.1063     0.2283    -0.3323    -0.2577    -0.2002    -0.2934    -0.1577
            (   48)    (   48)    (   48)    (   48)    (   48)    (   48)    (   48)    (   48)    (   48)    (   48)
            S=0.044    S=0.368    S=0.059    S=0.236    S=0.059    S=0.011    S=0.039    S=0.086    S=0.021    S=0.142

VAR026       0.4346    -0.4245     0.3499     0.5331     0.1166    -0.4356     0.3239     0.3218     0.1566     0.0226
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.001    S=0.001    S=0.006    S=0.001    S=0.210    S=0.001    S=0.011    S=0.011    S=0.139    S=0.438

VAR027      -0.4124     0.5217    -0.7262    -0.7082     0.4360     0.0570    -0.2878    -0.3735    -0.3501    -0.2885
            (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.001    S=0.001    S=0.001    S=0.001    S=0.001    S=0.347    S=0.021    S=0.004    S=0.006    S=0.021

VAR028       1.0000    -0.8244     0.4153     0.5318     0.1205    -0.0627     0.2097     0.1036    -0.0175    -0.0436
            (    0)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.001    S=0.001    S=0.001    S=0.001    S=0.202    S=0.333    S=0.072    S=0.237    S=0.452    S=0.382

VAR030      -0.8244     1.0000    -0.6349    -0.5956     0.0372     0.0527    -0.2398    -0.1863    -0.0597     0.0064
            (   50)    (    0)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)    (   50)
            S=0.001    S=0.001    S=0.001    S=0.001    S=0.399    S=0.358    S=0.047    S=0.098    S=0.340    S=0.483
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APPENDIX 6 (continued)

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             VAR028     VAR030     VAR031     VAR032     VAR034     VAR036     VAR040     GOVT       STEFIN1    STEFIN2

VAR031       0.4153    -0.6849     1.0000     0.7661    -0.1611    -0.2296     0.4695     0.4554     0.3158     0.3531
            (    50)   (    50)   (     0)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)
            S=0.001    S=0.001    S=0.001    S=0.001    S=0.132    S=0.054    S=0.001    S=0.001    S=0.013    S=0.006

VAR032       0.5318    -0.5956     0.7661     1.0000     0.1172    -0.4775     0.6644     0.7085     0.3073     0.4305
            (    50)   (    50)   (    50)   (     0)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)
            S=0.001    S=0.001    S=0.001    S=0.001    S=0.209    S=0.001    S=0.001    S=0.001    S=0.015    S=0.001

VAR034       0.1205     0.0372    -0.1611     0.1172     1.0000    -0.4440     0.2319     0.1200    -0.2377    -0.0694
            (    50)   (    50)   (    50)   (    50)   (     0)   (    50)   (    50)   (    50)   (    50)   (    50)
            S=0.202    S=0.399    S=0.132    S=0.209    S=0.001    S=0.001    S=0.053    S=0.203    S=0.048    S=0.316

VAR036      -0.0627     0.0527    -0.2296    -0.4775    -0.4440     1.0000    -0.3858    -0.4334    -0.2406    -0.3749
            (    50)   (    50)   (    50)   (    50)   (    50)   (     0)   (    50)   (    50)   (    50)   (    50)
            S=0.333    S=0.358    S=0.054    S=0.001    S=0.001    S=0.001    S=0.003    S=0.001    S=0.046    S=0.004

VAR040       0.2097    -0.2398     0.4695     0.6644     0.2319    -0.3858     1.0000     0.7904     0.2625     0.3645
            (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (     0)   (    50)   (    50)   (    50)
            S=0.072    S=0.047    S=0.001    S=0.001    S=0.053    S=0.003    S=0.001    S=0.001    S=0.033    S=0.005

GOVT         0.1036    -0.1863     0.4554     0.7085     0.1200    -0.4334     0.7904     1.0000     0.3705     0.4398
            (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (     0)   (    50)   (    50)
            S=0.237    S=0.098    S=0.001    S=0.001    S=0.203    S=0.001    S=0.001    S=0.001    S=0.004    S=0.001

STEFIN1     -0.0175    -0.0597     0.3158     0.3073    -0.2377    -0.2406     0.2625     0.3705     1.0000     0.6383
            (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (     0)   (    50)
            S=0.452    S=0.340    S=0.013    S=0.015    S=0.048    S=0.046    S=0.033    S=0.004    S=0.001    S=0.001

STEFIN2     -0.0436     0.0064     0.3531     0.4305    -0.0694    -0.3749     0.3645     0.4398     0.6383     1.0000
            (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (    50)   (     0)
            S=0.382    S=0.483    S=0.006    S=0.001    S=0.316    S=0.004    S=0.005    S=0.001    S=0.001    S=0.001
```

BIOGRAPHICAL SKETCH

William Earl Sparkman was born in Brooksville, Florida, on February 13, 1947. He lived in Crystal River, Florida, where he graduated from high school in 1965. He attended the University of Florida and earned the B.A. degree in history in 1969. Mr. Sparkman taught school at the American School of Asunción, Paraguay, from June through December 1969. He returned to the United States and began teaching social studies at Williston High School, Williston, Florida, in 1970. While continuing to teach at Williston, he was admitted to the Graduate School of the University of Florida and worked toward an M.Ed. degree in educational administration that he received in 1973.

In September 1973, Mr. Sparkman was awarded an EPDA Fellowship at the University of Florida. He resigned from Williston High School and began advanced graduate work in the College of Education. He completed the Ed.S. degree in 1974 majoring in educational administration. He was then awarded a graduate assistantship in the Department of Educational Administration and Supervision to complete the doctorate. In January 1975, Mr. Sparkman was made a research assistant in the Institute for Educational Finance where we worked as assistant coordinator of the 18th National School Finance Conference held in New Orleans.

He is a member of Phi Delta Kappa, Beta Theta Pi (social fraternity), and Florida Blue Key. Mr. Sparkman is married to the former Loyce Ann Katz.

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

K. Forbis Jordan

K. Forbis Jordan, Chairman
Professor of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

Kern Alexander

Kern Alexander
Professor of Education

I certify that I have read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in scope and quality, as a dissertation for the degree of Doctor of Philosophy.

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This dissertation was submitted to the Graduate Faculty of the College of Education and to the Graduate Council, and was accepted as partial fulfillment of the requirements for the degree of Doctor of Philosophy.

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